CHAPTER

5

Municipal Conservation Program

5.1 INTRODUCTION

The primary goal of the Municipal Conservation Program is to assist the Santa Cruz Active Management Area (AMA) in maintaining safe-yield conditions by gradually reducing per capita water consumption, encouraging the best available water conservation practices, and maximizing the efficient use of water. The Arizona Department of Water Resources (Department) supports the efficient use and equitable distribution of water in an environmentally and economically sound manner through long-range planning, cooperative regional efforts, technical assistance, and regulatory programs. The efficient use and replenishment of water sources will help prepare the Santa Cruz AMA water users for periods of prolonged drought and assist in preserving economic development in this area.

The Department recognizes that the Municipal Conservation Program alone will not maintain the goals of the Santa Cruz AMA in the long term. During the third management period, additional water management strategies will be examined that may result in a modification of this plan. These strategies could include the redistribution of water for municipal purposes during periods of prolonged drought, replenishment or storage of excess water during periods of above average precipitation, increased emphasis on improvements in distribution systems to reduce lost and unaccounted for water and increased water conservation education, and implementation of water conservation measures during periods of hot weather and low rainfall. A seasonal versus an annual water management approach may also be examined. Some of the potential water management strategies will be outside the context of the management plan, but will be included in other programs implemented by the Department including the Assured Water Supply Program (AWS Program) and Well Spacing Rules. Additional water management programs may be implemented by entities outside the Department such as a water replenishment district that may be formed in the Santa Cruz AMA.

Statutory tools may not be currently available to implement alternative management approaches. In this case, legislative changes would need to precede a management plan modification to incorporate newly authorized programs. This process could take several years to complete.

Municipal water providers in the Santa Cruz AMA include one city, several private water companies, a few mobile home and/or recreational vehicle parks, and several miscellaneous municipal users, that deliver water withdrawn from wells for non-irrigation uses such as residential, commercial, governmental, industrial, and construction uses. Municipal water providers can also include well cooperatives and irrigation and improvement districts. The Department regulates municipal providers serving more than 250 acre-feet of water for non-irrigation use annually as large municipal providers. Those providers serving 250 acre-feet or less annually are regulated as small municipal providers. Large and small providers have different conservation and reporting requirements. Appendix 5A contains a list of all the large and small municipal water providers in the Santa Cruz AMA as of 1998.

The municipal sector accounts for about a third of the total Santa Cruz AMA water use. Between 1985 and 1995 population growth rates in the AMA averaged more than five percent per year. Population is expected to continue to increase by two to three percent per year during the third management period with a corresponding increase in municipal water demand. The Assured Water Supply Rules (AWS Rules) adopted by the Department in 1995, which apply to all five AMAs, do not contain criteria for the Santa Cruz AMA for proving consistency with the AMA goals. The AWS Rules will be modified to include these criteria as the goals for the Santa Cruz AMA are further defined. Modifications to the AWS Rules addressing consistency with goal criteria will require new development to demonstrate that it will be consistent with the maintenance of safe-yield conditions and prevention of long-term declines in local water table levels in the AMA. A.A.C. R12-15-705. The AWS Program is expected to have a significant impact on water management in the municipal sector during the third management period.

Reductions in the gallons per capita per day (GPCD) water use rates of large municipal providers are required by the Groundwater Code (Code). Conservation programs instituted by water providers in response to regulatory requirements of the First and Second Management Plans have not resulted in achieving the GPCD reductions that were expected. A series of hot, dry years in the mid-1990s and high rates of water losses in some years have contributed to a fluctuating AMA average GPCD rate since 1990. Increased conservation efforts and additional water management options are needed in order to maintain safe-yield conditions and prevent long-term declines in local water table levels in the Santa Cruz AMA.

This chapter contains the following sections:

- Statutory Provisions
- AWS Program
- First and Second Management Plans
- Municipal Program Issues
- Third Management Plan Municipal Conservation Program
- Non-Regulatory Efforts
- Future Directions

5.2 STATUTORY PROVISIONS

5.2.1 Per Capita Requirements for Large Municipal Providers

The Code requires that the management plans for each AMA include a conservation program for municipal uses. For the First, Second, and Third Management Plans, the Code expressly mandates that the programs require reasonable reductions in per capita use. A.R.S. §§ 45-564(A)(2), 45-565(A)(2), and 45-566(A)(2). As originally enacted, the Code did not exempt any municipal providers from the requirement to achieve reductions in per capita use. Consequently, the Municipal Conservation Program in the First Management Plan established maximum GPCD requirements for all municipal providers, regardless of size.

In 1986, the Legislature amended the statutes governing the Second and Third Management Plans to exempt "small municipal providers" from the requirement to achieve reasonable reductions in per capita use. Laws 1986, Ch. 107, §§ 2 and 3. Instead of requiring small municipal providers to achieve reductions in per capita use, the statutes require the director to establish "reasonable conservation requirements for small municipal providers." A.R.S. §§ 45-565(A)(4) and 45-566(A)(4). Until 1994, "small municipal provider" was defined in the Code as "a city, town, private water company or irrigation district that supplies water for non-irrigation use, serves less than five hundred people and supplies less than one hundred acre-feet of water for non-irrigation use during a calendar year." Laws 1986, Ch. 107, § 1. In 1994, the Legislature changed the definition of small municipal provider to "a municipal provider that supplies 250 acre-feet or less of water for non-irrigation use during a calendar year." A.R.S. § 45-561(13).

Two other statutory amendments have created exceptions to the requirement that municipal providers achieve reasonable reductions in per capita use. In 1991, the Legislature exempted large untreated water providers from the requirement to achieve reductions in per capita use. Laws 1991, Ch. 211, §§ 16, 17, and 18. However, there are no large untreated water providers in the Santa Cruz AMA. In 1992, the Legislature enacted legislation requiring the director to include in each management plan a Non-Per Capita

Conservation Program (NPCCP) for large municipal providers as an optional, alternative program to the program requiring reductions in per capita use. Laws 1992, Ch. 183, §§ 5, 7, and 9. The latter amendment is described in greater detail in the following two sections.

5.2.2 Non-Per Capita Conservation Requirements for Large Municipal Providers

Each provider regulated under the NPCCP is required to implement specific residential and non-residential conservation programs for interior and exterior water use, a public education program relating to water conservation, and a program to meter most service area connections. Additionally, providers who are regulated under the NPCCP are required to either reduce their groundwater pumping consistent with the AWS Rules (A.A.C. R12-15-701, *et seq.*) or eliminate their use of mined groundwater by the year 2010. The NPCCP is a performance-based program with compliance determined by the effective implementation of stipulated conservation measures and the required groundwater use reduction. For the Third Management Plan, the statutory requirements for the NPCCP are found at A.R.S. § 45-566.01.

5.2.3 Conservation Requirements for Individual Users

In addition to requiring the director to establish conservation requirements for municipal providers, the Code requires the director to establish in the Third Management Plan "such other conservation measures as may be appropriate for individual users." A.R.S. § 45-566(A)(2). An "individual user" is a person or entity who receives water from a municipal provider for a non-irrigation use to which specific conservation requirements apply. In the Third Management Plan, the director has established conservation requirements for the following individual users: (1) turf-related facilities, (2) large-scale cooling facilities, and (3) publicly-owned rights-of-way.

A municipal provider that receives notice of an individual user conservation requirement is responsible for complying with the requirement with respect to all individual users to which it serves water and to which the requirement applies, with two exceptions. First, the municipal provider is not responsible for complying with the requirement with respect to an individual user that has received notice of the requirement directly from the director. In that case, the individual user is responsible for complying with the requirement. Second, if the requirement is substantially identical to an industrial conservation requirement, the municipal provider is not responsible for complying with the requirement with respect to an individual user which it has identified in writing to the Department by a specified date. If the individual user was in existence when the management plan was adopted, the municipal provider must have identified the individual user to the Department at least 90 days before the management plan was adopted. A.R.S. § 45-566(B). If the individual user came into existence after the management plan was adopted, the municipal provider must identify the individual user to the Department within 90 days after it begins serving water to the individual user. If the municipal provider identifies a new individual user to the Department more than 90 days after it begins serving water to the individual user, the municipal provider will be responsible for complying with the individual user requirement until the end of the year in which it first identifies the user to the Department. See section 5-111 of the municipal conservation requirements.

5.2.4 Distribution System Requirements

The director is required to include in the Third Management Plan "additional economically reasonable conservation requirements for the distribution of water, other than stored water, withdrawn from wells, for cities, towns, private water companies and irrigation districts within their service areas." A.R.S. § 45-566(A)(5). Distribution system requirements for municipal providers consist of a requirement to limit lost and unaccounted for water and a requirement to meter deliveries. See section 5-112 of the municipal conservation requirements.

5.3 ASSURED WATER SUPPLY PROGRAM

The Code requires persons proposing to offer subdivided lands for sale or lease within an AMA to demonstrate that the proposed subdivision has an assured water supply. A.R.S. § 45-576. If a subdivider fails to demonstrate that a proposed subdivision has an assured water supply, the plat for the subdivision may not be approved by a city, town, or county, and the State Real Estate Commissioner may not issue a public report authorizing the sale or lease of the subdivided lands. A.R.S. § 45-576(B) and (C).

There are two mechanisms for demonstrating that a proposed subdivision has an assured water supply. First, the subdivider may apply for and obtain a Certificate of Assured Water Supply (Certificate of AWS) from the director. Second, the subdivider may obtain a written commitment of water service for the subdivision from a city, town, or private water company which the director has designated as having an assured water supply. A.R.S. § 45-576(A). For both of these purposes, "assured water supply" means that sufficient water of adequate quality will be continuously available to meet the water needs of the proposed use for at least 100 years; that the projected use is consistent with the management plan and achievement of the management goals for the AMA; and that the financial capability has been demonstrated to construct the water facilities necessary to make the supply of water available for the proposed use, including a delivery system and any storage facilities or treatment works. A.R.S. § 45-576(I).

In 1995, the Department adopted rules to carry out the purposes of the assured water supply statute. A.A.C. R12-15-701, *et seq.* The AWS Rules specify in detail what an applicant for a Certificate of AWS or a Designation of Assured Water Supply (Designation of AWS) must demonstrate. Of particular relevance to the Municipal Conservation Program are the requirements for demonstrating that a proposed use is consistent with the management plan and achievement of the management goal for the AMA.

5.3.1 Consistency With Management Goal

Because the timing of the adoption of the AWS Rules coincided with the creation of the Santa Cruz AMA, the current AWS Rules do not address the unique goal of the AMA to maintain safe-yield conditions and prevent long-term declines in local water table levels. The AWS Rules must be modified to include provisions which will assist in maintaining the goals of the Santa Cruz AMA.

5.3.2 Consistency with Management Plan

In order to demonstrate consistency with the AMA's management plan, the AWS Rules generally require that an applicant be in compliance with its management plan requirements. For municipal providers, the applicable management plan requirements are the municipal conservation requirements set forth in section 5.10 of this chapter. Thus, if a municipal provider applying for a Designation of AWS is regulated under the Total GPCD Program, the provider must either be in compliance with its total GPCD requirement or with the terms of a stipulation and consent order entered into to remedy non-compliance with the GPCD requirement in order to demonstrate consistency with the management plan. *See* A.A.C. R-12-15-706(B).

An applicant for a Certificate of AWS is not subject to the municipal provider conservation requirements set forth in the management plan because the applicant is not a municipal provider as defined in A.R.S. § 45-561. However, certain uses that may be associated with a certificate application, such as turf-related facilities and landscaping or water features in publicly owned rights-of-way, are subject to the individual user requirements in sections 5-111(A) of the municipal conservation requirements if water withdrawn from wells, other than stored water, will be used. For all individual users, whether served by a designated or undesignated provider, either the entity delivering water or the individual user (e.g., homeowners association, turf-related facility owner, etc.) will be responsible for compliance with the individual user requirements.

The water use of a new subdivision will also affect a large municipal provider's ability to meet its GPCD target. While individual users or the entity delivering water to them are responsible for meeting the individual user requirements, new subdivisions should be developed in a manner consistent with the conservation requirements in the management plan. This could be accomplished by some relatively simple and voluntary efforts by the certificate applicant or the homebuilder. A few examples are:

- Establish Conditions, Covenants, and Restrictions or other conditions that will limit landscaping within the subdivision
- Provide lot buyers with written water conservation information, including irrigation management of automatic irrigation timers
- Landscape model homes in accordance with Xeriscape™ principles
- Feature state of the art water conservation fixtures and appliances in model homes
- Limit high water use vegetation in common areas to those areas that provide significant recreational benefits
- Provide low water use landscaping packages to home buyers
- Design simple water harvesting features in landscaping designs
- Locate hot water heaters to minimize long hot water pipe runs or install looped systems
- Include community pools in large developments as an alternative to individual home pool installation

The application for a Certificate of AWS requires submittal of general information to allow the Department to estimate the water demand of the subdivision. This general information includes submittal of any Conditions, Covenants, and Restrictions or other conditions that will limit exterior water demand and any proposed conservation practices, policies, devices, etc. that may be utilized.

5.3.2.1 Consistency With Management Plan Criteria For Applicants For Certificates Of Assured Water Supply

Some subdivisions may include a golf course and other non-residential water uses. Demands associated with non-residential use are considered to be part of the subdivision offering if they will be part of the common promotional plan and they are covered by the official definition of a subdivision (A.R.S. § 32-2101). A golf course may be the single largest water use associated with the needs of a development. An 18-hole golf course typically uses enough water on an annual basis to meet the needs of more than 2,400 households in the Santa Cruz AMA. Because of this large volume of water, a person applying for a Certificate of AWS that includes a golf course within the development plan must demonstrate the following:

> That any new golf courses to be included within the development plan will be designed to comply with any applicable turf-related facility conservation requirements contained in Chapter 6 of this management plan. To make this demonstration, the applicant shall describe in its application the design and landscaping plans for any golf courses that will be included within the development.

When the AWS Rules are revised, more specific Consistency with Management Plan requirements for Certificates of AWS may be included.

5.3.3 Assured Water Supply Role in the Municipal Conservation Program

After the AWS Rules are modified to incorporate Santa Cruz AMA goal criteria, the municipal sector water demand is anticipated to be managed in a more secure and long-term fashion. Contingency planning for drought as well as management of supplies to allow for future growth and protect existing water users will improve the security of the water supply. However, difficulties in obtaining secure long-term supplies may persist in the AMA. Municipal providers must cope with institutional and geographic constraints in

managing water supplies. Physical management of water supplies is outside of the current scope of the management plan or the AWS Rules; however, the creation of a water bank or district could address water distribution and securing or firming of water supplies in local areas of the Santa Cruz AMA.

5.4 FIRST AND SECOND MANAGEMENT PLANS

Until 1994, the Santa Cruz AMA was included as a portion of the Tucson AMA and was managed under the safe-yield goal mandated for the Tucson AMA. For the First and Second Management Plans, the Department was required by statute to focus on per capita reductions as a mechanism to move the municipal sector toward safe-yield. Reductions in GPCD rates result in conservation of the water supply. To achieve these reductions, the Total GPCD Program was established as the base program for all municipal providers.

The Department began with a basic percentage reduction approach in the First Management Plan and moved to addressing each provider's unique water use characteristics in the Second and Third Management Plans. In each management period, the Department has addressed additional water management concerns through technical assistance, new incentives for the use of renewable supplies, and corrections to data and assumptions based on the availability of new data and technologies. In addition to the Total GPCD Program, voluntary alternative programs that were not based solely on per capita reductions were developed in the Second Management Plan for providers able to limit or reduce reliance on groundwater supplies. The intent of these programs is to allow providers more flexibility in managing water demand in exchange for their commitment to limit groundwater use. While programs to limit strictly groundwater use may have limited applicability in the Santa Cruz AMA, the option for regulation under alternative programs is still applicable due to variations in water service area demand characteristics and distribution systems.

5.4.1 First Management Plan Approach

The approach to municipal conservation in the First Management Plan was to incrementally reduce the water use by all providers toward an ultimate target of 140 GPCD. The higher the calculated GPCD rate of a particular provider, the greater the required reduction in per capita use. The 1980 census population and total water use were used to calculate each provider's 1980 GPCD rate, from which a total GPCD requirement was calculated that moved the provider one quarter of the way from its 1980 GPCD rate to 140 GPCD. Providers at or under 140 GPCD in 1980 were not required to conserve further but were not permitted to use more than 140 GPCD per year.

This approach to GPCD reductions assumed that all providers had the same potential to reduce per capita water use in their service area. Providers were given the opportunity to request a modification of their total GPCD requirement if they considered them unreasonable or if there were technical or factual errors in calculating the requirement.

Both small and large municipal water providers were regulated in the same manner in the First Management Plan. In addition, there was a "Special Provider" category for service areas which were dominated by non-residential/institutional uses whose water use patterns and conservation potential could not be adequately characterized by per capita rates. These special providers were assigned a residential GPCD requirement and specific conservation requirements for non-residential uses.

5.4.2 Second Management Plan Approach

During development of the Second Management Plan, the Department took into account the unique situations and growth patterns within each service area that influence the provider's ability to reduce per capita use. It was recognized that new users should be more efficient than existing users due to low-flow

plumbing fixture ordinances and the trend toward installation of low water use landscapes. It was also recognized that existing users with high water use rates had greater conservation potential than those with lower water use rates.

The approach to setting GPCD requirements for large municipal providers in the Second Management Plan was based on an analysis of conservation potential for each service area using 1985 as the base year. Conservation potential for existing residential uses was estimated by comparing existing water use patterns to assumed levels of savings that could accrue by implementing selected conservation programs which had been successfully implemented in Arizona, California, and other regions in the United States. These savings were applied to the existing residential GPCD rate for each large municipal provider to develop a per capita target for existing residential uses. New residential uses were assumed to come in at a model water use rate that reflected low water use landscaping practices and low flow plumbing fixtures. Non-residential uses were held constant from base year levels. The full allotment for existing turf-related facilities was allowed. The percentage of lost and unaccounted for water was assumed to stay at the base year level. However, if it was under five percent, it was assumed to be at five percent; and, if it was over 10 percent, it was assumed to be at 10 percent.

Providers whose base year GPCD rate was under a certain level were not required to conserve further, while those with relatively high GPCD rates were assumed to have greater conservation potential. A total GPCD requirement was established for each large municipal provider combining the assumptions for existing residential, new residential, non-residential, turf-related facility use, and lost and unaccounted for water. A final and two intermediate per capita requirements were set for each water provider in an attempt to encourage providers to make progressive conservation efforts throughout the management period.

Because non-residential uses may continue to increase and, in most cases, are not subject to Certificate of AWS requirements limiting groundwater use, modifications to the total GPCD requirement for disproportionate increases in non-residential growth were not allowed in the Second Management Plan. To address this, the Department established the Alternative Conservation Program (ACP) which regulates providers based on a residential per capita requirement and the implementation of specific non-residential conservation measures. In order to participate in this more flexible program, providers were required to limit their groundwater withdrawals to a historic level, which required them to utilize renewable supplies or retire groundwater rights to serve the remaining demand.

Additionally, providers that served predominantly non-residential/institutional uses were allowed to apply for the Institutional Provider Program (IPP) which replaced the "Special Provider" program in the First Management Plan.

In the Second Management Plan, small municipal providers were not assigned a total GPCD requirement. Instead, they were required to comply with the following requirements: minimize waste, maximize efficiency of outdoor watering, encourage reuse, and reduce the GPCD rate in their service areas.

5.4.3 Overview of Changes During the Second Management Period

Since 1990, the Second Management Plan has been modified twice. In general, changes were made to the Municipal Conservation Program to provide incentives for use of non-groundwater sources, to encourage conservation through a grants program, and to add a non-per capita conservation program. Additionally, a legislative change created an incentive for municipal providers to use groundwater withdrawn pursuant to approved remedial action projects.

5.4.3.1 Management Plan Modifications

5.4.3.1.1 First Modification (1992)

An exclusion for the use of untreated Central Arizona Project (CAP) water was included in the first modification. Providers that were willing to make a commitment to ultimately serve effluent to a non-residential customer, but did not yet have access to it, were allowed to serve untreated CAP water to the customer without having that water counted in the total GPCD rate for up to 10 years. This incentive was adopted to encourage construction of the necessary non-potable distribution system before the effluent is available so that service of effluent will begin sooner.

The Conservation Assistance Grants Program was adopted to provide financial, planning, technical, and other support and services to all regulated sectors. Each year grants are awarded to support education, projects, and research that promote water conservation. The funds to support the grants program come from a portion of the groundwater withdrawal fee paid by all regulated water users in each AMA.

5.4.3.1.2 Second Modification (1995)

Legislation passed in 1994 and incorporated into the second modification redefined small municipal providers as those providers serving 250 acre-feet of water or less annually. Small municipal providers had previously been defined as those serving 100 acre-feet of water or less annually or serving a population of 500 people or less. The intent of this legislation was to focus conservation efforts on providers with higher water use and greater conservation potential. In the Santa Cruz AMA, passage of this legislation reduced the number of large municipal providers from five to three. However, by 1996 one small provider had transitioned back into the large municipal provider category.

The NPCCP, adopted by the Legislature in 1992 and incorporated into the second modification, exempts qualified large municipal providers from per capita conservation requirements by substituting reasonable conservation measures (RCMs) that target both residential and non-residential users in place of per capita requirements. A.R.S. § 45-565.01(A). Providers who elect to enter this program are required to substantially reduce the use of mined groundwater in their service area. As the third management period progresses, it may become clear that the NPCCP, requiring reductions in groundwater dependency, is not helpful to the Santa Cruz AMA in maintaining its goals. If that is the situation, a statutory change may be sought to adjust the groundwater reduction requirement of the NPCCP to a requirement that is effective in addressing the AMA water management goals.

The second modification provided an incentive for the use of renewable supplies by allowing large municipal providers whose annual groundwater use is 30 percent or less of their total annual water use to remain at or below their Second Management Plan First Intermediate GPCD requirement. This incentive could be used in each year that the provider achieved the groundwater limitation standard of 30 percent or less, through the year 1999.

5.4.3.2 Legislative Change

The Santa Cruz AMA was created in 1994 from the southernmost portion of the Tucson AMA. The unique hydrologic characteristics of the AMA (see Chapter 2) and the dual management goal of the AMA require a water management strategy different from the other four AMAs in the state. In late 1997, the Department finished drafting a concept paper that describes not only the hydrologic characteristics of the area, but also issues and possible water management programs, including rules and regulations. The process used to develop these ideas has depended on significant public input, and public input will be sought throughout the refinement of these regulatory programs, up to final adoption. Criteria for the consistency with goal requirement of the AWS Rules and water replenishment options are yet to be

developed and adopted which relate specifically to the water management goals of the Santa Cruz AMA. Preliminary criteria for the location of new and replacement wells in the Santa Cruz AMA are included in this plan; however, additional criteria will need to be developed and the criteria contained in this plan may be updated and adopted through a management plan modification. The Third Management Plan will be adopted before the rest of these accompanying rules, regulations, and programs are fully developed, reviewed by the public and adopted. The Third Management Plan will also need to be modified for those programs that overlap with the management plan. The municipal program is connected to additional well spacing, recharge and assured water supply provisions yet to be adopted.

In 1997, legislation was enacted providing an incentive for municipal providers to use groundwater withdrawn pursuant to an Environmental Protection Agency (EPA) or Arizona Department of Environmental Quality (ADEQ) "approved remedial action" project. Prior to the passage of this bill, the withdrawal and use of groundwater, regardless of its quality, was counted as groundwater use in the determination of compliance with the management plan conservation requirements (see Chapter 10). This legislation requires the Department to account for remediated groundwater withdrawn pursuant to an approved remedial action project in the same manner as surface water for determining compliance with the management plan conservation requirements. Thus, this groundwater is counted as surface water in the compliance determination. Laws 1997, Ch.287, § 51(B). Although the legislation did not expressly apply to conservation requirements adopted in the Second Management Plan, the Department has indicated through a substantive policy statement that it will apply the incentive to Second Management Plan conservation requirements. Section 5.7 contains a discussion of this incentive as it applies to the Third Management Plan.

5.5 MUNICIPAL PROGRAM ISSUES

Throughout the preparation of the Third Management Plan, extensive input was obtained from the municipal water use sector to identify issues and concerns that need to be addressed during the third management period. This section summarizes the key issues and concerns raised by the Department and by water providers in these discussions. These issues have been taken into consideration in program development. Some issues require legislative change or other actions not under the Department's control.

5.5.1 Private Water Company Issues

Some municipal water providers regulated under the Municipal Conservation Program are privately-owned companies separate from the city, town, or county in which they are located. While local plumbing and landscape ordinances may apply within the private water company service area, the water company itself lacks the authority to enact or enforce ordinances regulating water use by its customers. In addition to being regulated by the Department, private water companies are regulated by the Arizona Corporation Commission (ACC), an elected body whose mission includes exercising exclusive state regulatory authority over public service corporations (public utilities) in the public interest. The ACC monitors the operations of approximately 350 private water utility companies throughout Arizona, reviewing company financial records and recommending revenue requirements and rates and charges to be collected. The regulatory responsibilities of the ACC are fully defined in Article XV of the Arizona Constitution and §§ 40-201, *et seq.*, Arizona Revised Statutes, including A.R.S. § 40-250, requiring that all public service corporations obtain ACC approval before establishing or changing any rate.

Private water companies have raised several issues regarding the relationship of the Department's requirements and the ACC's view of rate recovery associated with the requirements. The most significant issues identified include: (1) the perception of uncertainty in the ability to recover the holding costs of CAP subcontracts and financing the construction of facilities for receipt and use of renewable supplies and (2) the impact of the ACC's position in rate cases that implementation of conservation programs is

discretionary because the Department does not identify and mandate specific conservation programs or measures needed to be carried out by the provider.

These issues have been extensively reviewed and discussed by the Department staff, private water company representatives, and ACC staff. The ACC has indicated that "although they cannot guarantee recovery of costs prior to their incurrence" they would consider cost recovery for the use of renewable supplies and the implementation of conservation measures, applying the principles of "used and useful" and "least-cost alternative." In the past, these principles have meant that a provider would have to be actively providing a resource in order to recover costs and any conservation measure implemented would have to be the most cost-effective option before the recovery of costs would be allowed. Private water companies argue that these principles do not guarantee cost recovery as they are considered by the ACC on a case-by-case basis.

During the development of the Third Management Plan, the Department explored the possibility of establishing a municipal conservation program designed specifically for private water companies. In order to meet the goals of the Department and obtain the support of the ACC, the Department considered a program which would mandate specific conservation measures and reduce reliance on groundwater supplies, especially in the Phoenix, Tucson, and Prescott AMAs. It was determined that additional statutory authority would be needed to implement such a program and the Department decided not to pursue this action at this time. However, Department staff, with the cooperation of the regulated community, will continue to explore options, including continued dialogue between the two agencies aimed at establishing a united strategy to achieve the most economically efficient reduction in groundwater reliance (generally in Phoenix, Tucson, and Prescott AMAs) by private water companies and providing more certainty of cost recovery.

5.5.2 Use of Renewable Water Supplies

In the Younger Alluvium of the Santa Cruz River, where most of the water demand is concentrated in the Santa Cruz AMA, groundwater, surface water, surface water subflow, and effluent that flows on the surface and as subflow are commingled and combine to fill the available storage in the Younger Alluvium. Therefore, renewable supplies are not available to the Santa Cruz AMA in the same sense that they are available in the Phoenix, Tucson, and Pinal AMAs; from large surface water reservoirs or from the Colorado River via the CAP canal. During prolonged periods of precipitation, the Younger Alluvium storage is filled and water in excess of the storage capacity of the Younger Alluvium is not captured and continues through the AMA.

Because the Santa Cruz River basin extends into Mexico, water withdrawals for and effluent generated by demands in Nogales, Sonora can impact the water availability in the Younger Alluvium of the Santa Cruz AMA. Without additional sources of water brought into the AMA, renewable supplies are essentially limited to natural recharge from precipitation events and the discharge of effluent from Mexico.

Use of renewable water supplies in the Santa Cruz AMA are dissimilar to Phoenix, Tucson, and Pinal AMAs in that no incentive is needed to encourage water users to transition from one source of supply to another. Instead, water management efforts in the Santa Cruz AMA relative to renewable water supplies must hinge on refilling the storage capacity in the Younger Alluvium and protecting the net natural recharge that occurs along the mountain fronts.

A number of incentive programs for the use of renewable supplies were included in the Second Management Plan and some are included in this plan (see Chapter 8 for a summary of all incentives). These incentives are based on the philosophy of the Phoenix, Tucson, and Pinal AMAs that groundwater use should be transitioned to use of a renewable supply. For example, in the Third Management Plan effluent used directly or recovered within the area of impact does not count in the GPCD calculation.

Several other incentives were considered for inclusion in the Third Management Plan. None of these incentives is completely applicable to the water supply conditions in the Santa Cruz AMA. During the third management period, the Department may modify the Third Management Plan for the Santa Cruz AMA to include water management incentives that are appropriate for this AMA.

In the meantime, the option of extinguishing recharge credits or storing non-recoverable water in particular areas as a compliance mechanism may be considered during the third management period, even in advance of a violation. Providers who anticipate an allotment violation are encouraged to develop a proactive response program in cooperation with the Department (see section 10.7.3 of Chapter 10). Since there are currently no recharge credits accrued in the Santa Cruz AMA, it is unclear whether this type of option would be meaningful for the Santa Cruz AMA.

5.5.3 Assured Water Supply Issues

The AWS Rules in general apply to all AMAs, including the Santa Cruz AMA, but consistency with AMA goal criteria have yet to be developed for the Santa Cruz AMA. The AWS Rules will have to be modified to include this component. In the meantime, assured water supply applications are being reviewed based on the best available information. The Department is still improving its understanding of hydrologic characteristics in the Santa Cruz AMA and is expanding its database for use in a hydrologic model. While the model will assist in refining some characteristics of the AMA hydrology, it will not be able to answer all water management or hydrologic questions. Interpretation will still be used. As a greater understanding of the hydrology of the AMA is gained, the AWS Rules may be modified to include additional criteria. This means that new development must be evaluated extremely carefully and that a conservative approach is prudent.

5.5.4 Total Gallons Per Capita Per Day Program Issues

Municipal providers are responsible for ensuring efficient water use by their customers including: single family (single family homes or mobile homes on their own lots); multifamily (apartments, town homes, patio homes, duplexes, triplexes, master metered permanent resident mobile home parks); commercial (stores, shopping centers, and malls); industrial (golf courses, cemeteries, factories, schools, parks); government (city or county office buildings and associated grounds); and construction (dust control, metered fire hydrant use during road or highway work). For providers regulated under the Total GPCD Program, compliance is determined by comparing the provider's actual GPCD use rate with the provider's total GPCD requirement for the year.

When the Second Management Plan total GPCD requirements were assigned in 1990, the Department received many requests for administrative review. Adjustments were requested for a number of reasons including inaccurate population projections, seasonal population, historical disproportionate increases in non-residential growth, and inaccurate assumptions for new residential growth.

Population projections for 1992, 1995, and 2000 were one of the factors used in the Second Management Plan to calculate total GPCD requirements for each large municipal provider. There are several uncertainties associated with using population projections in the total GPCD calculations. The economic forecast at the time the projections are developed can influence the projections, the ratio of single family to multifamily projections can influence the per capita water use rate, and the way a provider actually grows in relation to the projections can either make it easier or more difficult for a provider to meet its requirements.

To address these uncertainties in the Third Management Plan, population projections will not be used to calculate a total GPCD requirement. Instead, an annual GPCD requirement will be calculated using a component method that uses actual new single family and multifamily populations at model use rates

combined with water use components for existing residential, non-residential, existing turf-related facilities, and lost and unaccounted for water. This approach is discussed in more detail in section 5.6.1.1 of this chapter.

Seasonal visitors, those customers not maintaining a legal residence in the State of Arizona, do not count as resident service area population in GPCD calculations due to the definition of resident population used by the Census Bureau. This population can skew GPCD rates to make it appear that water use is becoming more or less efficient, depending on whether or not the proportion of seasonal population to resident population is decreasing or increasing. Providers that can demonstrate a significant impact due to seasonal population can request an administrative review of the annual population estimate.

The practice of water providers reporting the number of service connections rather than the actual number of housing units served can also result in inaccurate GPCD calculations because it will result in an inaccurate population estimate. This may occur in areas where one service connection serves more than one housing unit at the address as when manufactured homes are installed or removed from an existing meter or when a primary residence has a guesthouse attached to the same meter.

The ratio of residential to non-residential demand can also impact the GPCD rate of a water provider. Adding a new large non-residential customer can drastically increase overall water demand and negatively impact a provider's ability to achieve compliance with the total GPCD requirement. The First Management Plan contained a provision which allowed a provider experiencing a disproportionate increase in non-residential use to apply for a modification to its total GPCD requirement to accommodate the increased non-residential use. Although the Second Management Plan did not contain this provision, it did contain other provisions which allowed a provider to remain in compliance while serving disproportionately increasing non-residential uses. For example, delivery of effluent, other than effluent recovered outside the area of impact of an underground storage project, was excluded when determining a provider's compliance with its GPCD requirement. Thus, a provider could serve an unlimited amount of effluent to a non-residential customer without the service having any impact on its GPCD rate. Additionally, the ACP and the NPCCP were developed in the Second Management Plan to allow the non-residential sector to grow without per capita restrictions if renewable water supplies were used. In the Third Management Plan, the Department will continue to offer alternative programs and an effluent use incentive to allow for flexibility to address disproportionate non-residential growth.

5.5.5 AMA Issues

There has been a concern that water use by small, private domestic wells (not more than 35 gallons per minute pump capacity) in the AMA represents a significant unreported demand and threat to the local portion of the AMA goal. As of 1998, about 1,300 small or "exempt" wells were registered within the Santa Cruz AMA, although the exact number of actual exempt wells has not been verified. While many of these wells are entitled to withdraw up to 56 acre-feet of water per year, it is unlikely that the amount of withdrawal per well averages anywhere near this volume for several reasons. First, the sheer number of registered wells is not representative of the actual number of wells that were completed and on which a pump was installed. Many on the list of 1,300 registered wells may be duplicates, may not have been drilled, may have been drilled but may not have found water, or may never have been put to use. While the Department requires information on the completion of wells within AMAs, site inspections of exempt wells occur less frequently than inspections of large wells, due to the limited impact and volume of small wells. Second, 56 acre-feet of water per well is a considerable volume of water when water use patterns of individual well owners are analyzed. Municipal providers in the Santa Cruz AMA average just under 190 GPCD. The average number of persons per household in Santa Cruz County pursuant to the 1990 U.S. Census was about 3.5 persons per occupied housing unit. This is less than one acre-foot per well per year. Most exempt wells provide water for one household, but it is conceivable that an exempt well could be shared among more than one household.

The Department developed an estimate of exempt well water demand for the Third Management Plan. Of the more than 1,300 exempt wells registered in the Santa Cruz AMA, a complete data record exists for just over 800. These wells were examined based on their geographic distribution within the AMA. These wells were categorized based on three geographic locations: the Younger Alluvium of the Santa Cruz River, the older alluvium of the Santa Cruz River, and the Nogales Formation. Each of these wells was assumed to serve an average of 1.5 households with an average of 3.5 persons per household (the 1990 U.S. Census figure for the Nogales County Control Division). At an assumed GPCD rate of 186, the total residential demand of all of these wells would be approximately 900 acre-feet per year. In addition to this residential demand, there are about 20 wells located within the Younger Alluvium of the Santa Cruz River that are known to maintain less than two acres of pasture or other small cropped areas. The use for irrigation of these areas is estimated to be just over 200 acre-feet per year. Therefore, the total estimated demand associated with the number of exempt wells in existence within the Santa Cruz AMA as of late 1997 is about 1,100 acre-feet per year.

Additional exempt wells are registered in the Santa Cruz AMA listing an intended use of stock-watering. It is difficult to estimate the potential demand from an exempt well for stock-watering in the Santa Cruz AMA for several reasons. First, many ranchers own or lease land near the Santa Cruz River and cattle drink directly from the river. Second, many stock ponds fill naturally during summer and winter rains and do not need to be constantly filled using the well. Third, the Department does not maintain records of the number of cattle within the AMA that utilize stock ponds. And, finally, the Department has not verified how many of the exempt wells used for stock watering are actually in use or used for that purpose.

5.6 THIRD MANAGEMENT PLAN MUNICIPAL CONSERVATION PROGRAM

Conservation requirements have been established pursuant to the statutory provisions of the Code for large municipal providers and small municipal providers. This section details the programs and requirements that have been developed for the Third Management Plan.

5.6.1 Conservation Requirements for Large Municipal Providers

In order to establish conservation requirements for large municipal providers in the Second Management Plan, the Department identified existing water use patterns and service area characteristics that influence a provider's water conservation potential. Assumptions about future service area population growth and water supply and demand were also included in the analysis. This assessment was referred to as the "municipal provider profile." Using population projections for 1992, 1995, and 2000, targets for each water use sector or component (existing residential, new residential, non-residential, turf-related facility, and lost and unaccounted for water) were combined to establish a preassigned total GPCD requirement. Two intermediate requirements in 1992 and 1995 were established to allow a phase-in to achieve the final Second Management Plan requirement in 2000.

For the Third Management Plan, the Department used a similar approach to identify water use characteristics. Information obtained from annual water use reports included water deliveries, monthly water use by sector, water source, and number of housing units added to the service area annually. Additional information included: (1) annual population estimates based on the provider-supplied housing unit information from the annual reports, (2) Department of Economic Security persons per housing unit data, and (3) individual interviews with water providers to assess existing water conservation programs and determine water conservation potential.

In the Third Management Plan, the Department will not use population projections in combination with water use components to preassign total GPCD requirements. Instead, each component is assigned a separate water use rate, and a total GPCD requirement will be calculated each year based on actual population growth within each service area. As in the Second Management Plan, there will be two

intermediates and a final GPCD requirement for all large municipal providers. Each large municipal provider will be noticed of its GPCD components for their service area and the method for calculating a total GPCD requirement. Providers may apply for a variance from or an administrative review of the conservation requirements within 90 days after the notice is given.

As an alternative, a large municipal provider may apply to be regulated under the NPCCP, the ACP, or the IPP. The following sections describe the base Municipal Conservation Program and how it was developed and briefly describes the alternative conservation programs.

5.6.1.1 Total Gallons Per Capita Per Day Program

As in previous management periods, the base municipal program for the Third Management Plan is the Total GPCD Program. All large municipal providers regulated under this program must limit the overall GPCD water usage within their service areas to the amount allowed under their total GPCD requirements.

For the third management period, an annual total GPCD requirement will be calculated for each water provider using a component method. The components of the total GPCD requirement are existing residential use, new residential interior use, new single family residential exterior use, new multifamily residential exterior use, turf-related facility use, non-residential use, and lost and unaccounted for water. Each large provider has an assigned per capita per day or per housing unit per day component use as shown in Table 5-5 of section 5.10 or described in section 5-103.B. The component calculation is described in more detail in Appendix 5C.1-2. The sum of the component volumes for each provider will be multiplied by the actual population or housing units in the service area each year to determine the annual total GPCD requirement for the provider. The resulting allowable volume will be compared to the actual amount of water withdrawn, diverted, or received in the calendar year to determine whether the water provider is in compliance.

5.6.1.1.1 Total Gallons Per Capita Per Day Program Development

Existing Residential Conservation Potential

Conservation potential is an estimate of the amount of reduction in water use that may result from implementing conservation measures or programs. To determine the existing residential conservation potential of each large municipal provider in the Second Management Plan, the Department used a base year to determine water use rates for existing residential water users, and then analyzed residential water use patterns and selected appropriate conservation programs. This analysis resulted in a GPCD reduction for existing users that was factored into the total GPCD requirement for the provider. In developing the Third Management Plan, staff conducted a detailed analysis of all assumptions used to estimate the conservation potential of existing residential users in the Second Management Plan. This included an extensive inventory and analysis of available water conservation devices, measures, and programs. Adjustments were made to the Second Management Plan assumptions on water savings, market penetration, and installation rates based on documented water savings from water conservation programs throughout the United States, including the southwest.

The average monthly water use for the years 1992 through 1995 was used to determine the conservation potential for existing residential water use in the Santa Cruz AMA. The "base year" data for each provider are shown in Appendix 5D. Four categories of water use were established to indicate existing residential interior and exterior conservation potential. Depending on the average interior and exterior water use within each service area, providers were categorized as having no potential, minimum potential, moderate potential, or maximum potential as shown in Table 5-1.

TABLE 5-1
SANTA CRUZ ACTIVE MANAGEMENT AREA EXISTING RESIDENTIAL CONSERVATION POTENTIAL CATEGORIES
SANTA CRUZ ACTIVE MANAGEMENT AREA

Category	Interior GPCD	Single Family Exterior GPHUD	Multi-family Exterior GPHUD
No Potential	≤57	≤75	≤6
Minimum Potential	58-74	76-107	7-26
Moderate Potential	75-87	108-135	27-58
Maximum Potential	>87	>135	>58

GPCD = gallons per capita per day
GPHUD = gallons per housing unit per day

The Department assigned appropriate conservation measures to the minimum, moderate, and maximum categories that could be implemented to achieve water savings commensurate with the provider's conservation potential. Additionally, the Department evaluated existing conservation programs within each service area and, based on this information, the conservation savings assigned to a provider were adjusted to take into account programs already implemented. The water savings associated with each conservation measure were applied to the provider's water use characteristics to calculate the existing residential component.

Models for New Residential Users

For new residential water users, those residential users who begin to receive water from a municipal provider after 2000, the Department utilized a similar model-based approach to that used in the Second Management Plan. Current water fixture flow rates, existing technology, and behavioral patterns were evaluated and incorporated into updated models for new interior and exterior water use. In addition, data from several residential water use studies and surveys conducted during the second management period were used to develop the Third Management Plan models.

The interior residential water use model was updated to reflect performance specifications for toilets, showerheads, and faucet aerators in current local, state, and federal plumbing codes; use of water-efficient clothes washers and dishwashers; and documented, typical water use behavioral patterns. It should be noted that low-flow toilet requirements limit water use to 1.6 gallons per flush; however, to compensate for occasional double-flushing, the model rate for toilets was adjusted to 1.7 gallons per flush. A miscellaneous water use component was added to the Third Management Plan model to allow for reasonable water consumption associated with fixtures and appliances not specifically addressed as model components. Behavioral patterns affecting the duration and frequency of use of plumbing fixtures and water using appliances were reevaluated based on data obtained from residential flow trace studies conducted in the Phoenix area and other communities throughout the United States and Canada sponsored by the American Water Works Association Research Foundation. As a result, an interior residential model use rate of 57 GPCD, a 4 GPCD decrease from the Second Management Plan model of 61 GPCD, will be used as an interior component for all new residential water users through the third management period (see Table 5-2). Detailed assumptions used to establish the interior residential water use model are described in Appendix 5E.

TABLE 5-2
THIRD MANAGEMENT PLAN
INTERIOR WATER USE MODEL FOR NEW RESIDENTIAL DEVELOPMENT
SANTA CRUZ ACTIVE MANAGEMENT AREA

Device	Model Assumption	Model Use Rate
Toilet	5 flushes/person/day * 1.7 gallon/flush	9 GPCD
Shower/Bath	(2.5 gpm * 7.9 min/shower * 0.9 shower/person/day) + (32.5 gal/bath * 0.1 bath/person/day)	21 GPCD
Faucets	Kitchen & Bathroom 2.5 gpm* 4 minutes/person/day	10 GPCD
Dishwasher	9.8 gal/load * 0.2 loads/person/day	2 GPCD
Clothes Washer	30.3 gal/load * 0.3 loads/person/day	9 GPCD
Miscellaneous		6 GPCD
TOTAL		**57 GPCD**

Note: Figures are rounded

The exterior water use model for new single family development for the second management period considered average swimming pool demand, evaporative cooling demand, and efficient water application for typical landscaping. The same approach, using updated information, was used for the Third Management Plan. Because exterior water use is largely independent of the number of persons per household, the exterior model is expressed in gallons per housing unit per day (GPHUD). The approach for the third management period assumes that the same potential exists for all new housing units to implement landscaping patterns appropriate to the local climate and practice efficient water application. Thus, a single model for all new single family residential development was used.

In 1997, the Department conducted a survey of outdoor water use practices at new housing in cooperation with the University of Arizona, Tucson Water, and Metropolitan Domestic Water Improvement District (Craft, 1997). Responses were received from occupants of over 600 single family residences built since 1991. The results of the survey provided valuable information on the frequency of installation of evaporative coolers, swimming pools, pool covers, and spas; the size and number of gardens and turf areas; and the number and types of landscaping plants typical of new housing. In 1996, the Phoenix AMA provided funding for a survey of evaporative cooler use which was performed by the University of Arizona in conjunction with the City of Phoenix (Karpiscak, et al., 1998). Findings from these studies were also used to develop the exterior model. Landscape water use and landscaping design assumptions are based on the potential for the provider to promote the use of, provide incentives for, and educate new residents about the benefits of using low water use plants and practicing efficient landscape watering. Efficient landscape watering techniques include the use of drip irrigation systems and proper water application scheduling.

In addition to the Phoenix AMA evaporative cooler study and the Tucson AMA landscape survey, other data used in developing the exterior residential model were a review of common landscape patterns in new homes in the Nogales and Rio Rico service areas, a survey of swimming pool and spa contractors and owners, a compilation of Santa Cruz AMA evapotranspiration and rainfall data, University of Arizona horticultural research data, and a landscape watering schedule developed by the Pima County Cooperative Extension Service (Pima County Cooperative Extension Service, 1996). Although it is recognized that not all homeowners will meet the model use rate individually, it is anticipated that new per capita water use on average over an entire service area will conform to the model rate. It was assumed that new homes have

the potential to implement appropriate landscaping practices and that providers have a stronger ability to influence a new homeowner's decisions than those in an established neighborhood.

The model rate for new single family exterior residential water use is 107 GPHUD in the Third Management Plan. The new multifamily exterior residential water use model is 26 GPHUD. Table 5-3 summarizes the assumptions used to develop the single family exterior water use model for the Third Management Plan. Table 5-4 summarizes the assumptions used to develop the exterior water use model for multifamily residential development. Details of the assumptions are contained in Appendix 5F.1-3.

TABLE 5-3
EXTERIOR WATER USE MODEL FOR NEW SINGLE FAMILY RESIDENTIAL DEVELOPMENT
SANTA CRUZ ACTIVE MANAGEMENT AREA

	Model Use Rate
Pool Use	4 GPHUD
Spa Use	0 GPHUD
Evaporative Cooling	5 GPHUD
Landscape Watering	98 GPHUD
Single Family Residential Exterior Total	**107 GPHUD**

GPHUD = gallons per housing unit per day

TABLE 5-4
EXTERIOR WATER USE MODEL FOR NEW MULTIFAMILY RESIDENTIAL DEVELOPMENT
SANTA CRUZ ACTIVE MANAGEMENT AREA

	Model Use Rate
Pool Use	0 GPHUD
Spa Use	0 GPHUD
Evaporative Cooling	5 GPHUD
Landscape Watering	21 GPHUD
Multifamily Residential Exterior Total	**26 GPHUD**

GPHUD = gallons per housing unit per day

Non-Residential Water Use

The Third Management Plan base year, composed of the average annual non-residential water use from 1992 to 1995 exclusive of water served to turf-related facilities, was evaluated and compared to the Second Management Plan base year use. In general, the lower of the two base year numbers was used to set the Third Management Plan non-residential per capita component. Long-term residential and non-residential growth are typically proportionate in most service areas. Those large water providers experiencing

dramatically disproportionate long-term non-residential growth may apply for the ACP or the NPCCP. In both of these programs, constraints on non-residential GPCD are removed in return for a commitment from the water provider to take steps to assist in the achievement of the AMA water management goal and to encourage all customer classes to practice maximum water use efficiency. In the Third Management Plan, the Department will continue to regulate certain non-residential customers of municipal water providers as individual users including turf-related facilities, large-scale cooling facilities, and landscaping and water features in public rights-of-way as described in section 5-111 of the municipal conservation requirements.

Turf-Related Facility Water Use

In the Second Management Plan, the maximum annual water allotment of a turf-related facility was factored into a water provider's total GPCD requirement if that turf-related facility was in existence by December 26, 1984 and was served groundwater by that provider. The allotments for turf-related facilities that were developed after the mid-1980s were not factored into a water provider's total GPCD requirement. As a result, new turf-related facilities were expected to be served with effluent. Any use of groundwater on a new turf facility had the effect of reducing the amount of groundwater that could be served to other customers of the water provider if the provider was to meet its total per capita requirement. If an existing turf-related facility converted from groundwater to another water supply such as effluent or if the provider no longer served the facility, the maximum annual allotment for the facility was still factored into the provider's total GPCD requirement.

In both the Second and Third Management Plans in years when the existing turf-related facility uses less than its full allotment, the balance of the allotment is available for the provider to serve other uses. In years with higher water demand, an existing turf-related facility can use water in excess of its allotment, within the credit and debit limits in the provider's flexibility account, without adversely impacting the per capita compliance status of the provider. However, the turf-related facility is still required to meet its allotment requirement in order to be in compliance with the conservation requirements for turf-related facilities (see section 6.3.8 of Chapter 6). In the Santa Cruz AMA, if a provider replaces deliveries of water withdrawn from wells to a turf-related facility with direct delivery of effluent, the provider benefits by: (1) not having the effluent delivery count in its GPCD rate when determining compliance and (2) by retaining the volume of the turf-facility allotment in the calculation of its total GPCD requirement. This provides a substantial incentive to providers to serve effluent.

In a manner similar to that in the Second Management Plan, the combined maximum annual water allotments for Second Management Plan existing turf-related facilities are factored into the annual calculation of the provider's per capita requirement as the turf-related facility component in the Third Management Plan. This component is factored into the annual requirement if the water provider converts from serving water withdrawn from wells, other than stored water, to serving any other source of water. However, if the provider no longer serves the facility, the allotment is not included in the turf-related facility component. For example, if the golf course is owned by a homeowners' association which decides to discontinue water service from the provider and serve the existing facility through recovery of CAP recharge credits, the maximum annual water allotment for the golf course is not included in the water provider's turf-related facility component. In the Second Management Plan, the provider would have retained the volume of the allotment in its total GPCD requirement under this scenario. As in the Second Management Plan, allotments for new turf-related facilities are not factored into the calculation of a provider's GPCD requirement. The Third Management Plan approach is designed to discourage development of new turf-related facilities that are dependent on water withdrawn from wells, other than stored water, and to prevent water providers from receiving an allotment of water for facilities they no longer serve. Appendix 5G lists the turf-related facilities that are included in the turf-related facility component for water providers. The component will be adjusted if a water provider no longer serves the facility.

This approach assumes that new golf courses within service areas will be served with direct use effluent or effluent recovered within the area of impact, which are not counted in determining compliance with gallons per capita per day requirements. Additional water withdrawn from wells, other than stored water, for new turf-related facilities is not allocated in the turf-related facility component, which is combined with the other components in the calculation of a provider's total gallon per capita per day requirement. However, there may be cases where direct use effluent and effluent recovered within the area of impact will not be physically available to serve a new turf-related facility, or cases where such effluent will eventually be used but is not currently available, or not available in sufficient quantity. In these cases, an existing large municipal provider may apply for an administrative review.

In the case where direct use effluent and effluent recovered within the area of impact will not be physically available to serve the new turf-related facility within a reasonable period of time, the provider will receive a permanent adjustment to its per capita requirement, if effluent recovered outside the area of impact of the storage is used to serve the new facility. In the case where direct use of effluent or effluent recovered within the area of impact is committed to serve the facility and delivery of the effluent will be initiated within four years, but a longer period is necessary for sufficient effluent to be produced to serve the entire facility, the provider will receive a temporary adjustment to its total GPCD requirement with no requirement to use effluent recovered outside the area of impact during the transition period. The adjustment will remain in effect only until sufficient direct use effluent or effluent recovered within the area of impact is available to serve the entire facility, not to exceed eight years, and may be adjusted as the volume of effluent use increases. The adjustment will be terminated if the infrastructure necessary to deliver the effluent to the facility is not in place at the beginning of the fourth year after the provider commences service to the facility.

In either case, the adjustment will consist of an addition to the provider's turf-related facility component in the amount of the turf-related facility's allotment as calculated under the conservation requirements in Chapter 6. However, no adjustment will be granted above a volume that would allow the provider to use more water for non-residential use during a year than an amount calculated by multiplying the provider's base period non-residential GPCD use rate (including turf-related facility use), or 21 GPCD, whichever is higher, by the provider's service area population for the year, then by the number of days in the year.

Lost and Unaccounted for Water

In the Third Management Plan, large municipal providers must limit the amount of water that is lost and unaccounted for in their distribution systems each year to no more than 10 percent of all water withdrawn, diverted, or received in that year. Second Management Plan per capita requirements were held to lost and unaccounted for water use rates in the base year. Providers with less than 10 percent lost and unaccounted for water in the base year were assumed to be able to maintain this lower rate throughout the second management period. Because the Third Management Plan regulatory standard is 10 percent for all providers, those with lower loss rates will be allowed their actual lost and unaccounted for water each year up to the 10 percent limit in the calculation of the provider's annual total GPCD requirement.

5.6.1.1.2 Total Gallons Per Capita Per Day Compliance

Each provider's compliance with the Total GPCD Program will be determined annually by comparing the provider's actual annual volumetric usage of all water (except effluent used directly and stored effluent that is recovered within the area of impact) withdrawn, received, and diverted for non-irrigation use to the volume of water permitted by summing the components. The amount of water permitted is the amount of water the provider could legally withdraw, divert, or receive during the year for non-irrigation use, calculated by multiplying the provider's total GPCD requirement for the year by the provider's service area population as of July 1 of the year and then multiplying the product by the number of days in the year.

Any credits or debits in the provider's flexibility account will be taken into account when determining compliance as discussed below.

Flexibility Account

To account for the impacts of weather variations on municipal water use, the Department established a municipal flexibility account for each large provider in the Second Management Plan to determine compliance with the total GPCD requirement. This same approach will be used to determine compliance with total GPCD requirements in the Third Management Plan. Under the flexibility account approach, if a water provider uses less water in a year than is allowed by its total GPCD requirement, a credit is registered to the provider's flexibility account in the amount of the difference. If a provider uses more water during a year than allowed by its total GPCD requirement, a debit is registered to the provider's flexibility account in the amount of the difference. The maximum credit accumulation is 30 GPCD. The maximum debit accumulation is 10 GPCD. The provider is considered out of compliance with its total GPCD requirement if the debit accumulation exceeds 10 GPCD.

Annual Population Estimates

At the beginning of the management period, the initial service area population for each water provider is calculated using the latest Census numbers, which are disaggregated by unit type (single family, multifamily) to determine the base or "existing" housing unit count. Each year water providers are requested to report the total number of new housing units added to the service area. The reported new units are added to the "existing" housing units to derive the total housing unit figure for that year. Occupancy rates and persons per occupied housing unit rates from the latest Census are applied to the housing unit count to derive an estimated service area population.

5.6.1.2 Non-Per Capita Conservation Program

The NPCCP was added to the Second Management Plan in 1995 after being developed in cooperation with representatives of the water using community. This program requires a provider to implement specific conservation measures within its service area instead of requiring compliance with per-capita conservation requirements. A provider in this program must implement RCMs for interior and exterior residential water uses, interior and exterior non-residential uses, as well as an education program. The RCMs must be designed to result in water use efficiency within the provider's service area equivalent to the water use efficiency assumed in the provider's total GPCD requirement.

The Department has established a list of standard RCMs which are designed to achieve an efficiency equivalent to the assumptions used in the Total GPCD Program. However, if the standard RCMs do not fit the service area characteristics of a provider, the program allows the provider the flexibility to substitute measures that are designed to achieve the same savings yet fit the characteristics of the provider's service area. For the third management period, the Department will establish a steering committee to assist the Department in reviewing the existing standard RCMs, the substitute RCMs, and development of monitoring and reporting requirements which would be beneficial to the administration of the alternative programs. This steering committee will be primarily made up of Department staff, representatives of large municipal providers that are regulated under an alternative program, and any other members who the director considers to be necessary.

5.6.1.2.1 Groundwater Use Reduction Requirement

The provider must meet one of the following requirements to be eligible to participate in the NPCCP: (1) the provider must be a member of a groundwater replenishment district, (2) the provider must be designated as having a 100-year assured water supply under the Department's AWS Rules, or (3) the

provider must implement a plan to eliminate mined groundwater withdrawals by 2010. Because the statute creating the NPCCP was put in place prior to the creation of the Santa Cruz AMA, these eligibility requirements are not necessarily workable or meaningful for the Santa Cruz AMA. During the third management period, the Department will examine the eligibility requirements for the NPCCP and determine whether additional requirements should be developed that are more appropriate for the Santa Cruz AMA and its water management goals.

5.6.1.2.2 Reasonable Conservation Requirements

A set of Standard Residential, Non-Residential, and Education RCMs were developed by the Department with the aid of an advisory group composed of conservation program experts. Each RCM prescribes actions that must be taken by the provider to achieve water use efficiencies in each water use category. Providers who have already implemented these measures will be required to implement additional conservation measures to qualify for the program consistent with their existing conservation potential. Standard RCMs include interior, exterior, and education measures and are described in Appendix 5H.1-3. Substitute RCMs (Appendix 5H.4) were developed to allow a provider to develop a conservation program tailored to the characteristics of its service area.

In order for a provider to use a Substitute RCM in place of a Standard RCM, the provider must apply to the director and demonstrate that the Substitute RCM will be designed to achieve a water use efficiency equivalent to the Standard RCM.

Standard RCMs

A. Residential Interior
   1. Water Audit and Fixture Retrofit Program for Existing Residential Customers
   2. Ordinance or Condition of New Service Prohibiting Installation or Replacement of Plumbing Fixtures in Residential Housing Units Unless Fixtures Meet Water Savings Standards

B. Residential Exterior
   1. Audit Program for Existing Residential Customers
   2. Landscape Watering Advice Program for Existing and New Residential Customers
   3. Ordinance or Conditions of New Service for Model Homes in New Residential Developments
   4. Prohibit the Creation of Covenants, Conditions, and Restrictions Which Require the Use of Water-Intensive Landscaping or Which Prohibit the Use of Low Water Use Landscaping in New Residential Developments
   5. *One additional landscape RCM from the three below(choice of one of the following):*
      (1) Ordinance or Condition of New Service Limiting Use of Turf and Other Water-Intensive Landscaping in New Multifamily Developments, **or**
      (2) Ordinance or Condition of New Service Limiting Use of Turf and Other Water-Intensive Landscaping in Common Areas of New Single Family and Multifamily Developments, **or**
      (3) Rebate Program for New Residential Customers

C. Non-Residential Interior
   1. Interior Audit Program for Existing Facilities
   2. Ordinance or Condition of New Service Prohibiting Installation or Replacement of Plumbing Fixtures in Non-Residential Facilities Unless Fixtures Meet Water Savings Standards
   3. Distribution of Conservation Information to all New Non-Residential Customers and Submittal of Water Use Plan by New Large Facilities

D. Non-Residential Exterior
   1. Exterior Audit Program for Existing Non-Residential Customers

2. Landscape Ordinance or Condition of New Service for New Facilities

E. Education
   1. Public Information and Education Program

5.6.1.2.3 Compliance with the Non-Per Capita Conservation Program

A provider regulated under the NPCCP is in compliance with the program if it implements the agreed to RCMs and limits its use of groundwater to the amount allowed under the AWS Rules or the amount allowed under the straight-line reduction, whichever is applicable. The Department will use the written agreement for the NPCCP to monitor progress with the program. Each year, along with the Annual Water Withdrawal and Use Report, the municipal provider will be required to submit a progress report describing the implementation of each RCM, the cost of implementing the program, estimated or actual water savings, and a description of any difficulties with the program. Providers regulated under the NPCCP will also be required to comply with the individual user, distribution system, and monitoring and reporting requirements contained in this chapter.

5.6.1.3 Alternative Conservation Program

The ACP was developed for the Second Management Plan to give large municipal providers with disproportionately increasing non-residential water use an alternative to the Total GPCD Program. The program allows providers with disproportionately increasing non-residential water use the flexibility to serve those non-residential uses while achieving water use efficiency levels comparable to those set by the Total GPCD Program. The ACP consists of the following requirements: (1) a consistency with management goal demonstration, (2) a residential GPCD requirement, and (3) non-residential RCMs. As of 1998, there were no Santa Cruz AMA providers in the ACP.

5.6.1.3.1 Consistency with Management Goal Demonstration

In order to qualify for the ACP, a large municipal provider must demonstrate that withdrawals of water from a well, other than stored water, will meet the consistency with management goal requirements of the AWS Rules.

5.6.1.3.2 Residential GPCD Requirement

Each provider regulated under the ACP is required to comply with a residential GPCD requirement that is calculated using the GPCD and GPHUD components for existing residential, new single family and new multifamily water users. These components are derived using the same methodology as that used to calculate the residential portion of the total GPCD requirement. The residential GPCD requirement is recalculated annually based on growth within the service area using the same calculation used for the residential components of the Total GPCD Program. The residential GPCD calculation methodology is described in Appendix 5I.

5.6.1.3.3 Reasonable Conservation Measures

Providers regulated under the ACP must implement specific conservation measures for non-residential water users. Providers who have already implemented these measures will be required to implement additional conservation measures to qualify for the program. The non-residential requirements for the Third Management Plan have been modified and are now identical to the interior and exterior non-residential requirements for the NPCCP. The requirements are as follows:

A. Non-Residential Interior
   1. Interior Audit Program for Existing Facilities
   2. Ordinance or Condition of New Service Prohibiting Installation or Replacement of Plumbing Fixtures in Non-Residential Facilities Unless Fixtures Meet Water Savings Standards
   3. Distribution of Conservation Information to all New Non-Residential Customers and Submittal of Water Use Plan by New Large Facilities

B. Non-Residential Exterior
   1. Exterior Audit Program for Existing Non-Residential Customers
   2. Landscape Ordinance or Condition of New Service for New Facilities

Providers may also request a substitute measure for any non-residential requirements to be approved by the director.

5.6.1.3.4 Compliance with the Alternative Conservation Program

A provider regulated under the ACP is in compliance with the program if it does not exceed its residential GPCD requirements, implements the agreed to non-residential RCMs, and is consistent with the AMA goal under the AWS Rules. The Department will use the written agreement for the ACP to monitor progress with the program. Each year, along with the Annual Water Withdrawal and Use Report, the municipal provider will be required to submit a progress report describing the implementation of each non-residential RCM, the cost of implementing the program, estimated or actual water savings, and a description of any difficulties with the program. Providers regulated under the ACP will also be required to comply with the individual user, distribution system, and monitoring and reporting requirements contained in this chapter.

Consistency with Management Goal Criteria

A large municipal provider regulated under the ACP is in compliance with the consistency with management goal criteria if it complies with the consistency with management goal criteria of the AWS Rules for the Santa Cruz AMA.

Residential GPCD Requirement

Compliance with the residential GPCD requirement will be determined in a manner similar to that used to determine compliance with the total GPCD requirement. As in the Total GPCD Program, there is a flexibility account for providers regulated under the ACP. However, because the requirement only applies to residential GPCD use, the maximum positive balance is 21 GPCD and the maximum negative balance is 7 GPCD. The residential GPCD use rate will be compared to the residential GPCD requirement plus any credits or minus any debits accrued in the flexibility account. The residential GPCD requirement will be calculated on an annual basis by adding together the assigned residential components. Providers with an annual GPCD rate that exceeds the maximum flexibility account debit will be considered out of compliance with the residential GPCD requirement.

Non-Residential Requirement

A provider regulated under the ACP is in compliance with the non-residential requirement if it implements the agreed to standard non-residential RCMs or any substitute non-residential RCMs approved by the director.

5.6.1.4 Institutional Provider Program

The IPP in the Second Management Plan replaced the special provider category in the First Management Plan and is continued in the Third Management Plan. The IPP allows those providers with primarily non-residential type uses and who are unable to economically utilize renewable water supplies to be regulated under a program that focuses on the specific water use characteristics of their service area. The IPP is designed for large municipal providers who supply more than 90 percent of their total water deliveries to non-residential water users. Specifically, these non-residential uses include prisons, hospitals, military installations, airparks, and schools. A provider may request admission to this program by submitting an application in writing to the director at any time during the third management period. If the request is approved, the provider will be assigned conservation measures specific to the non-residential uses in its service area and a maximum residential GPCD rate. The Department will grant institutional provider status only if the Total GPCD Program is not appropriate and the provider demonstrates that it cannot qualify for the ACP requirement to be consistent with the AMA goal or the NPCCP by limiting its groundwater use, retiring grandfathered groundwater rights, or using alternative sources of water. As described in section 5.6.1.2.1, the applicability of these qualifications need to be evaluated for the Santa Cruz AMA.

5.6.2 Conservation Requirements for New Large Municipal Providers

A new large municipal provider is defined as a city, town, private water company, or irrigation district that begins serving more than 250 acre-feet of non-irrigation water per year after January 1, 2000. All new large municipal providers will initially be assigned to the Total GPCD Program. Their total GPCD requirement will be calculated consistent with the component methodology used for existing large municipal providers.

The base year for new large municipal providers will be the year or years preceding the first year the provider began serving more than 250 acre-feet unless the director determines that water use during that period is not representative. The Department will use residential water use data for the base year to conduct an analysis of conservation potential and calculate a GPCD component for existing residential users. New users will be assigned the new residential model rates of 57 GPCD interior and 107 GPHUD exterior for new single family development and 57 GPCD interior and 26 GPHUD exterior for new multifamily development. The non-residential component will be based on the actual non-residential water use rate in the service area (excluding turf facility water use) up to 21 GPCD. Lost and unaccounted for water may constitute up to 10 percent of the total annual water use.

A new large provider may apply for an administrative review requesting a temporary adjustment to its total GPCD requirement in order to serve a turf-related facility. A temporary adjustment will be allowed if the provider demonstrates that direct use effluent or effluent recovered within the area of impact is committed to serve the turf-related facility beginning in four years, but a longer period is necessary for sufficient effluent to be produced to serve the entire facility. The adjustment will remain in effect only until sufficient direct use effluent or effluent recovered within the area of impact is available to serve the entire facility, not to exceed eight years, and may be adjusted as the volume of effluent use increases. The adjustment will be terminated if the infrastructure necessary to deliver the effluent to the facility is not in place at the beginning of the fourth year after the provider commences service to the facility. A permanent adjustment will not be granted to a new large municipal provider. If a new large municipal provider cannot serve a turf-related facility under its existing per capita requirement and direct use effluent or effluent recovered within the area of impact will not be physically available to serve the facility within a reasonable period of time, the provider may enroll in the Non-Per Capita Conservation Program or the Alternative Conservation Program, if it wishes to serve the facility.

Each new large municipal provider will be notified of its total GPCD requirement and will be given two full years to comply with the requirement. A new large municipal provider may apply for the NPCCP or the ACP in accordance with the provisions of these programs and is subject to the individual user requirements.

5.6.3 Conservation Requirements for Consolidated Providers and Providers that Acquire or Convey a Portion of a Service Area

If two or more municipal providers consolidate their service areas and their combined water use is more than 250 acre-feet or if a large municipal provider acquires a portion of another provider's service area, the consolidated provider, acquiring provider, or conveying provider will receive a recalculated or revised conservation requirement. A consolidated provider will be assigned to the Total GPCD Program and its GPCD requirement will be calculated by prorating the respective per capita component rates, populations, and water use as appropriate. A consolidated provider may apply for the NPCCP or the ACP. If one of the consolidated providers was regulated under one of those programs prior to the consolidation, the consolidated provider's application for the program must include only the information that has changed since the provider filed its initial application. Providers that acquire or convey a portion of a service area continue to be regulated under the conservation program they were regulated under prior to the acquisition or conveyance. However, if they were regulated under either the NPCCP or the ACP, they must reapply for regulation under the program within 180 days after the acquisition or conveyance and must submit only the information that has changed since the original application was filed.

5.6.4 Conservation Requirements for Small Municipal Providers

A small municipal provider is a provider that serves 250 acre-feet or less of water for non-irrigation use during a year. Small municipal providers are exempt from per capita conservation requirements. Instead the director is required to establish "reasonable conservation requirements" for small municipal providers. In the Third Management Plan, as in the Second Management Plan, small municipal providers are required to minimize waste of all water supplies, maximize efficiency in outdoor watering, encourage reuse of water supplies, and reduce total GPCD water use.

5.6.5 Regulatory Requirements for all Municipal Providers

5.6.5.1 Individual User Requirements

An individual user is a person who receives water from a municipal provider for non-irrigation uses to which specific conservation requirements apply. For the Third Management Plan, the director is required to establish "such other conservation measures as may be appropriate for individual users." A.R.S. § 45-566(A)(2). In the Second Management Plan, individual user requirements were established for turf-related facilities, publicly owned rights-of-way, and new large-scale cooling facilities. These requirements have been retained for the Third Management Plan with some modifications.

Turf-related facilities are subject to an allotment-based requirement. Landscaping planted after December 31, 1986 in publicly owned rights-of-way and watered with water withdrawn from wells, other than stored water, must be planted with plants from the Low Water Use/Drought Tolerant Plant List (Appendix 5B). The large-scale cooling tower requirements have been modified from the Second Management Plan requirements which applied only to towers built after January 1, 1990 with a total capacity of 250 tons or more. The Third Management Plan regulates large-scale cooling facilities of all ages with a total capacity of 1,000 tons or more.

In addition to these individual user requirements, the Third Management Plan contains an individual user requirement that was not included in the Second Management Plan. Water withdrawn from wells, other

than stored water, may not be used to maintain a water feature installed in a publicly owned rights-of-way after January 1, 2002.

Either the individual user or the municipal provider serving the individual user is responsible for complying with the individual user requirement. See section 5.2.3 for a discussion of how responsibility is determined.

5.6.5.2 Distribution System Requirements

All municipal providers are required to limit lost and unaccounted for water use in their service area. Lost and unaccounted for water includes line leakage, meter under-registration, evaporation or leakage from storage ponds or tanks, system and hydrant leaks or breaks, and illegal connections. Lost and unaccounted for water is defined as the total water from any source, except direct use effluent, withdrawn, diverted, or received in a year minus the total amount of authorized deliveries made by the municipal provider in that year. Small municipal providers must maintain lost and unaccounted for water volumes at no more than 15 percent. Large municipal providers are required to maintain systems not to exceed 10 percent lost and unaccounted for water.

Water that is put to a beneficial use and water system operation uses, whether metered or estimated, are not counted as lost or unaccounted for water. For the third management period, the Department will allow providers to either meter or estimate (using approved estimating procedures) the volume of water used pursuant to regulatory requirements such as well purging and line flushing. Providers may also estimate water for uses such as construction or fire services. However, all other water uses must be metered. This is especially important for large distribution systems which tend to have many hundreds of customers and many miles of distribution pipe. For a complete listing of uses that can be estimated, refer to Appendix 5J.

5.6.5.3 Monitoring and Reporting Requirements

All municipal providers are required to annually report to the Department the total volume of water used within the service area and the total volume of water delivered for various municipal purposes. In addition, the provider must calculate the volume of lost and unaccounted for water within the service area and report the total number of housing units, by unit type, added to the service area from July 1 of the previous calendar year to July 1 of the reporting year. Most municipal providers maintain a database and tracking system of this information for the previous 12 months. Maintaining this type of information allows municipal providers to identify difficulties in the operation of the distribution system and better meet water management objectives within their service areas.

Large municipal providers are required to separately measure and report the amount of water delivered each month for the following uses and categories: irrigation; residential, separated into single family and multifamily; and non-residential, separated into turf-related, commercial, industrial, government, construction, surface water treatment, and other uses.

All municipal providers are required to annually submit to the Department an updated service area and distribution system map that includes all potable and non-potable distribution lines greater than 4 inches, all potable treatment facilities, all well sites, all non-potable treatment facilities, and other information.

Large municipal providers regulated under the NPCCP or the ACP are required to submit a progress report that includes an evaluation of the results of implementing the RCMs in accordance with their written stipulated agreement.

5.7 INCENTIVES FOR THE USE OF RENEWABLE SUPPLIES AND REMEDIATED GROUNDWATER

Although they may have limited applicability in the Santa Cruz AMA incentives have been developed to increase the use of non-groundwater supplies. Effluent that is used directly or stored underground and recovered from within the area of impact is not counted in the per capita rate calculation for municipal providers regulated under the Total GPCD Program or the ACP.

In 1997, the Legislature enacted legislation significantly revising the Water Quality Assurance Revolving Fund (WQARF) Program to provide incentives for the use of remediated groundwater to facilitate the treatment of contaminated groundwater. Among other things, the WQARF legislation provides that when determining compliance with management plan conservation requirements, the Department shall account for groundwater withdrawn pursuant to approved remedial action projects under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) or Title 49, Arizona Revised Statutes, consistent with the accounting for surface water. Laws 1997, Ch. 287, § 51(B). See Chapter 7, section 7.4.4.6.3. Groundwater withdrawn pursuant to an approved remedial action project retains its legal character as groundwater for all other purposes under Title 45, Arizona Revised Statutes, including all other laws regulating groundwater withdrawal and use such as the assessment of withdrawal fees pursuant to A.R.S. § 45-611, *et seq.*; as well as laws regulating water exchanges as set forth in A.R.S. § 45-1001, *et seq.*; the transportation of groundwater as set forth in A.R.S. § 45-541, *et seq.*; withdrawals of groundwater for transportation to active management areas as set forth in A.R.S. § 45-551, *et seq.*; and underground water storage, savings, and replenishment as set forth in Title 45, Chapter 3.1, Arizona Revised Statutes.

For each approved remedial action project, the annual amount of groundwater that is eligible for the remediated groundwater accounting incentive is the maximum annual volume of groundwater that may be withdrawn pursuant to the project, as specified in the consent decree or other document approved by the EPA or ADEQ. However, if the project was approved prior to June 15, 1999 and the maximum annual volume of groundwater that may be withdrawn pursuant to the project is not specified in a consent decree or other document approved by the EPA or ADEQ, the annual amount of groundwater that is eligible for the remediated groundwater accounting incentive is the highest annual use of groundwater withdrawn pursuant to the project prior to January 1, 1999. The director may modify the annual amount of groundwater that is eligible for the accounting incentive if an increase in withdrawals is necessary to further the purpose of the project or if a change is made to the consent decree or other document approved by the EPA or ADEQ.

In order to qualify for the remediated groundwater accounting incentive, a person must notify the director in writing of the anticipated withdrawal of the groundwater prior to its withdrawal. The notification must include a copy of a document approved by ADEQ or the EPA such as the Remedial Action Plan (RAP), Record of Decision (ROD) or consent decree. Unless specified in the document, the notification must include the volume of groundwater that will be pumped annually pursuant to the project, the time period to which the document applies, and the annual authorized volume of groundwater that may be withdrawn pursuant to the project. The notification must also include the purpose for which the remediated groundwater will be used and the name and telephone number of a contact person. Additionally, at the time the notice is given, the person must be using remediated groundwater pursuant to the approved remedial action or must have agreed to do so through a consent decree or other document approved by ADEQ or the EPA. Remediated groundwater which qualifies for the accounting must be metered and reported separately from water withdrawn from wells that does not qualify for the accounting. (See section 5-114 of the municipal conservation requirements).

During the third management period, the Department will examine existing incentives and determine if additional water management based incentives can be developed and implemented for the Santa Cruz AMA.

5.8 NON-REGULATORY EFFORTS

In 1991, the Department initiated a grant program to provide funds for conservation assistance and augmentation of water supplies in the AMAs. Individual AMA programs focus on the areas of highest water conservation potential in each water use sector (municipal, industrial, and agricultural) based on total water usage, current water use practices, and potential for implementation of new conservation technologies. Funding for each AMA's grant program comes from an annual withdrawal fee levied and collected from all regulated water users in the AMAs. The Conservation Assistance Program is discussed in detail in Chapter 9, including a list of conservation programs funded during the second management period.

5.9 FUTURE DIRECTIONS

Modifications of the plan will result in better coordination with the AWS Rules consistency with goal criteria, when adopted for the Santa Cruz AMA. The ACP consistency with management goal criteria, specifically, will be more fully developed. In addition, the well spacing criteria included in this plan will be modified as additional hydrologic information is collected and analyzed and the hydrologic model for the AMA is completed.

The Department will also pursue legislation necessary to integrate the NPCCP into the goals of the Santa Cruz AMA. As the management strategies proposed in the concept paper are refined through public process, the groundwater use limitation requirement of the NPCCP would be modified to be consistent with the adopted regulations.

The Department will continue to work with the community to develop water management tools to assist the water users of the Santa Cruz AMA in maintaining safe-yield conditions and preventing long-term declines in local water table levels.

A remaining issue that needs to be addressed in the third management period is to design a conservation program approach for private water companies that meets both the ACC standards and the AMA water management goals. The Department will continue to work with the ACC in the development of policies related to water conservation and supply acquisition and on conditions for appropriate recovery of costs associated with the Department's regulatory programs.

There are ongoing issues about the effectiveness of water conservation programs. To the extent feasible, the Department will assist in designing follow-up studies and analyses to evaluate program effectiveness. This may be assisted through some funding from the Conservation Assistance Program for municipal research or evaluation projects. Throughout the third management period, the Department will work to improve water use data collection to support both planning and conservation program evaluation efforts. The Department will also continue to provide direct conservation assistance to water providers to assist them in meeting their regulatory requirements.

5.10 MUNICIPAL CONSERVATION REQUIREMENTS AND MONITORING AND REPORTING REQUIREMENTS

5-101. Definitions

In addition to the definitions set forth in Chapters 1 and 2 of Title 45 of the Arizona Revised Statutes, unless the context otherwise requires, the following words and phrases used in this chapter shall have the following meanings:

1. *"Canal" means a waterway constructed for the purpose of transporting water to a point of delivery, including main canals and lateral canals.*

2. *"Common area" means a recreational or open space area or areas owned and operated as a single integrated facility and maintained for the benefit of the residents of a housing development.*

3. *"Construction use" means a use of water for construction purposes, including the use of water for dust control, compaction, and preparation of building materials on construction sites.*

4. *"Direct use effluent" means effluent transported directly from a facility regulated pursuant to Title 49, Chapter 2, Arizona Revised Statutes, to an end user. Direct use effluent does not include effluent that has been stored pursuant to Title 45, Chapter 3.1, Arizona Revised Statutes.*

5. *"Effluent recovered within the area of impact" means effluent that has been stored pursuant to Title 45, Chapter 3.1, Arizona Revised Statutes, and recovered within the stored effluent's area of impact. For purposes of this definition, "area of impact" has the same meaning as prescribed by A.R.S. § 45-802.01.*

6. *"Existing individual user" means an individual user that was receiving water from a municipal provider as of the date the Third Management Plan was adopted.*

7. *"Existing large municipal provider" means a large municipal provider that was in operation and was serving water on or before January 1, 2000.*

8. *"Existing non-residential customer" means, with respect to a large municipal provider regulated under the NPCCP described in section 5-104 or the ACP described in section 5-105, a non-residential customer to whom the provider served water on the date the provider was accepted for regulation under the program.*

9. *"Existing residential customer" means, with respect to a large municipal provider regulated under the NPCCP described in section 5-104, a residential customer to whom the provider served water on the date the provider was accepted for regulation under the program.*

10. *"Existing residential housing units" means housing units which first began using water prior to July 1, 2000.*

11. *"Existing residential population" means the portion of the service area population of a municipal provider that resides in existing residential housing units.*

12. *"Exterior water use" means non-residential or residential uses of water for landscaping, pools, evaporative cooling systems, decorative fountains, and other outdoor uses of water.*

13. *"GPCD" means gallons of water per capita per day.*

14. *"GPHUD" means gallons of water per housing unit per day.*

15. *"Housing unit" means a group of rooms or a single room occupied as separate living quarters. Housing unit includes a single family home, a patio home, a townhouse, a condominium, an apartment, a permanently set-up mobile home, or a unit in a multifamily complex. Housing unit does not include a mobile home in an overnight or limited-stay mobile home park or a unit in a campground, motel, hotel, or other temporary lodging facility. A housing unit may be occupied by a family, a family and unrelated persons living together, two or more unrelated persons living together, or by one person.*

16. *"Incidental recharge" and "incidental recharge factor" have the definitions prescribed by A.R.S. § 45-561.*

17. *"Individual user" means a person receiving water from a municipal provider for non-irrigation uses to which specific conservation requirements apply, including turf-related facilities, large-scale cooling facilities, and publicly-owned rights-of-way.*

18. *"Interior water use" means non-residential or residential indoor uses of water, including toilet flushing, bathing, drinking, and washing.*

19. *"Landscapable area" means the entire area of a lot less any areas covered by structures, parking lots, roads, and any other area not physically capable of being landscaped.*

20. *"Large municipal provider" means a municipal provider serving more than 250 acre-feet of water for non-irrigation use during a calendar year.*

21. *"Large-scale cooling facility" means a facility which has control over cooling operations with a total combined cooling capacity greater than or equal to 1,000 tons. For the purposes of this definition, the minimum cooling tower size which shall be used to determine total facility cooling capacity is 250 tons. A large-scale cooling facility does not include a large-scale power plant that utilizes cooling towers to dissipate heat.*

22. *"Lost and unaccounted for water" means the total quantity of water from any source, except direct use effluent, withdrawn, diverted, or received by a municipal provider during a calendar year less the total quantity of authorized deliveries of water from any source, except direct use effluent, made by the municipal provider during the calendar year that are metered deliveries or deliveries that the municipal provider accounts for by a method of estimating water use approved by the director.*

23. *"Mined groundwater" has the definition prescribed by A.R.S. § 45-561.*

24. *"Multifamily housing unit" means a mobile home in a mobile home park and any permanent housing unit having one or more common walls with another housing unit located in a multifamily residential structure and includes a unit in a duplex, triplex, fourplex, condominium development, town home development, or apartment complex.*

25. *"Municipal distribution system" means a system of pipes, canals, or other works within a municipal provider's service area which are owned and operated by the provider to collect, store, treat, or deliver water for non-irrigation use.*

26. *"Municipal provider" means a city, town, private water company, or irrigation district that supplies water for non-irrigation use.*

27. *"New individual user" means an individual user that begins receiving water from a municipal provider after adoption of the Third Management Plan.*

28. *"New large provider" means a municipal provider that begins serving more than 250 acre-feet of water for non-irrigation use during a calendar year after January 1, 2000.*

29. *"New multifamily housing units" means multifamily housing units which first begin using water on or after July 1, 2000.*

30. *"New multifamily population" means the portion of the service area population of a municipal provider that resides in new multifamily housing units.*

31. *"New non-residential customer" means, with respect to a large municipal provider regulated under the NPCCP described in section 5-104 or the ACP described in section 5-105, a non-residential customer that begins receiving water from the provider after the provider is accepted for regulation under the program.*

32. *"New residential customer" means, with respect to a large municipal provider regulated under the NPCCP described in section 5-104, a residential customer that begins receiving water from the provider after the provider is accepted for regulation under the program.*

33. *"New single family housing units" means single family housing units which first begin using water on or after July 1, 2000.*

34. *"New single family population" means the portion of the service area population of a municipal provider that resides in new single family housing units.*

35. *"Non-residential customer" means a person who is supplied water by a municipal provider for a non-irrigation use other than a residential use.*

36. *"Non-residential exterior water use" means, with respect to a large municipal provider regulated under the NPCCP described in section 5-104 or the ACP described in section 5-105, water supplied by the provider and used for exterior water use purposes by non-residential customers, other than individual users, within the provider's service area.*

37. *"Non-residential interior water use" means, with respect to a large municipal provider regulated under the NPCCP described in section 5-104 or the ACP described in section 5-105, water supplied by the provider and used for interior water use purposes by non-residential customers, other than individual users, within the provider's service area.*

38. *"Reasonable Conservation Measures" or "RCMs" means policies, practices, rules, regulations, ordinances, or the use of devices, equipment, or facilities, that meet either of the following criteria:*

a. *An established and generally accepted practice among water providers that results in efficient use or conservation of water; or*

b. *A practice for which sufficient data are available from existing water conservation projects to indicate that significant water conservation or conservation related benefits can be achieved, that the practice is technically and economically reasonable and not environmentally or socially unacceptable, and that the practice is not otherwise unreasonable for most water providers to implement.*

39. *"Residential customer" means a person who is supplied water by a municipal provider for a residential use.*

40. *"Residential exterior water use" means, with respect to a large municipal provider regulated under the NPCCP described in section 5-104, water supplied by the provider and used for exterior water use purposes by residential customers within the provider's service area.*

41. *"Residential interior water use" means, with respect to a large municipal provider regulated under the NPCCP described in section 5-104, water supplied by the provider and used for interior water use purposes by residential customers within the provider's service area.*

42. *"Residential use" means a non-irrigation use of water related to the activities of a single family or multifamily housing unit or units, including exterior water use.*

43. *"Service area" has the definition prescribed by A.R.S. § 45-402.*

44. *"Service area population" means the number of people residing in housing units connected to distribution lines maintained by the municipal provider within its service area which are being served as of July 1 of the applicable year, as determined pursuant to section 5-103, subsection D.*

45. *"Service connection" means a coupling of a municipal provider's distribution system and its customer's water system.*

46. *"Single family housing unit" means a detached dwelling, including mobile homes not in mobile home parks.*

47. *"Small municipal provider" means a municipal provider that supplies 250 acre-feet or less of water for non-irrigation use during a calendar year.*

48. *"Turf-related facility" means any facility, including cemeteries, golf courses, parks, schools or common areas within housing developments, with a water-intensive landscaped area of 10 or more acres. Turf-related facilities include, but are not limited to, those facilities listed in Appendix 6.*

49. *"Water-intensive landscaped area" means, for a calendar year, an area of land which is watered with a permanent water application system and planted primarily with plants not listed in Appendix 5B (Low Water Use/Drought Tolerant Plant List), and any modifications to the list, and the total surface area of all bodies of water filled or refilled with water from any source, including effluent, that are an integral part of the landscaped*

area. Bodies of water used primarily for swimming purposes are not an integral part of a landscaped area.

5-102. Large Municipal Providers - Conservation Programs

A. *Beginning with the calendar year determined under Section 5-103, subsection A, paragraph 2, and continuing until the first compliance date for any substitute requirement in the Fourth Management Plan, a large municipal provider shall be regulated under the Total GPCD Program described in section 5-103, unless the provider has applied for and been accepted for regulation under the NPCCP described in section 5-104 or the ACP described in section 5-105 or is designated as an institutional provider under section 5-107.*

If a large municipal provider is accepted into the NPCCP, the ACP, or is designated as an institutional provider, the provider shall continue to comply with its total GPCD requirement until the first compliance date assigned by the director for the provider under the ACP, the NPCCP, or as an institutional provider.

A large municipal provider that was regulated under the NPCCP, the ACP, or the IPP under the Second Management Plan and that applies to be regulated under the same program in the Third Management Plan within 180 days following adoption of the plan shall continue to be regulated under the NPCCP, the ACP, or the IPP under the Second Management Plan, whichever applies, until January 1, 2002 or until the director approves or denies the provider's application under the Third Management Plan, whichever is later.

B. *A large municipal provider may apply for the NPCCP as described in section 5-104. If the director approves the application, the provider shall comply with the requirements of the NPCCP beginning on a date determined by the director but not later than January 1 of the year following the year in which the application is approved.*

C. *A large municipal provider may apply for the ACP as described in section 5-105. If the director approves the application, the provider shall comply with the requirements of the ACP beginning on a date determined by the director but not later than January 1 of the year following the year in which the application is approved.*

D. *A large municipal provider may apply for designation as an institutional provider pursuant to section 5-107. If the director approves the application, the provider shall comply with the institutional provider requirements assigned by the director beginning on a date determined by the director but not later than January 1 of the year following the year in which the application is approved.*

E. *All municipal providers shall comply with individual user requirements, distribution system requirements, and applicable monitoring and reporting requirements as prescribed in sections 5-111, 5-112, and 5-113.*

5-103. Large Municipal Provider Total Gallons Per Capita Per Day Program

A. Total GPCD Requirement

1. Beginning with the calendar year determined under paragraph 2 of this subsection, and for each calendar year thereafter until the first compliance date for any substitute municipal conservation requirement in the Fourth Management Plan, a large municipal provider regulated under the Total GPCD Program shall not withdraw, divert, or receive

water from any source, except direct use effluent and effluent recovered within the area of impact, for non-irrigation use during a year in a total amount that exceeds its total GPCD requirement for the year as calculated in subsection B of this section, except as provided in the flexibility account provisions in section 5-106.

2. *A large municipal provider regulated under the Total GPCD Program shall begin complying with its total GPCD requirements under the Third Management Plan beginning with calendar year 2000, except that if the provider's total GPCD requirement for the year 2000 under the Third Management Plan is lower than the provider's final total GPCD requirement under the Second Management Plan, the provider shall begin complying with its total GPCD requirements under the Third Management Plan beginning with calendar year 2002.*

B. Calculation of the Annual Total GPCD Requirement

A large municipal provider's total GPCD requirement for a year shall be calculated as follows:

1. *For each calendar year 2000 through 2004, multiply the provider's existing residential population for the year, as calculated pursuant to subsection D of this section, by the first intermediate GPCD component for existing residential population as assigned to the provider in Table 5-5.*

   For calendar years 2005 through 2009, multiply the provider's existing residential population for the year, as calculated pursuant to subsection D of this section, by the second intermediate GPCD component for existing residential population as assigned to the provider in Table 5-5.

   For the calendar year 2010, and for each calendar year thereafter until the first compliance date for any substitute total GPCD requirement in the Fourth Management Plan, multiply the provider's existing residential population for the year, as calculated pursuant to subsection D of this section, by the final GPCD component for existing residential population as assigned to the provider in Table 5-5.

2. *Multiply the provider's new single family population for the year, as calculated pursuant to subsection D of this section, by 57 GPCD.*

3. *Multiply the number of new single family housing units within the provider's service area as of July 1 of the calendar year in question by 107 GPHUD.*

4. *Multiply the provider's new multifamily population for the year, as calculated pursuant to subsection D of this section, by 57 GPCD.*

5. *Multiply the number of new multifamily housing units within the provider's service area as of July 1 of the calendar year in question by 26 GPHUD.*

6. *Multiply the provider's total service area population for the year, as calculated pursuant to subsection D of this section, by the GPCD component for non-residential use as assigned to the provider in Table 5-5.*

7. *Determine the provider's allocation for turf-related facilities for the year as follows:*

a. *Add together the maximum annual water allotments in Appendix 5G, in acre-feet, for those turf-related facilities assigned to the provider in Appendix 5G to which the provider served water from any source during the year. For any year in which the provider served water from any source to all of the turf-related facilities assigned to the provider in Appendix 5G, the sum of the allotments is shown in Table 5-5. The sum is the provider's turf-related facility component for the year.*

TABLE 5-5
EXISTING RESIDENTIAL, NON-RESIDENTIAL, AND TURF-RELATED FACILITY COMPONENTS
SANTA CRUZ ACTIVE MANAGEMENT AREA

Provider	Existing Residential (GPCD)			Non-Residential[1] (GPCD)	Turf-related Facility[2] (AF/year)
	TMP 1	TMP 2	TMP Final		
Citizens Utilities - Tubac	173	167	161	34	N/A
City of Nogales	100	98	97	46	860
Rio Rico Utilities	113	110	108	39	N/A
Valle Verde Water Company	76	74	73	11	N/A

TMP = Third Management Plan
AF = acre-feet
[1] *Providers with a non-residential component less than 21 GPCD may increase their non-residential component up to 21 GPCD.*
[2] *The number shown in this column is the sum of the maximum annual water allotments for all turf-related facilities assigned to the provider in Appendix 5G. In any year in which the provider serves water from any source to some, but not all, of the turf-related facilities assigned to the provider in Appendix 5G, the provider's turf-related facilities component for the year is the sum of the maximum annual water allotments shown in Appendix 5G for the turf-related facilities listed in that appendix to which the provider served water during the year.*
* *An example explaining how the Total GPCD Requirement is calculated is included in Appendices 5C.1 and 5C.2.*

b. *Multiply the component from subparagraph a of this paragraph by 325,851 gallons and then divide the product by the number of days in the year.*

8. *Divide the provider's allowable lost and unaccounted for water by the number of days in the calendar year. The provider's allowable lost and unaccounted for water is the lesser of the following:*

   a. *the provider's actual lost and unaccounted for water for the year, in gallons.*

   b. *an amount calculated by multiplying the total gallons of water from any source, except direct use effluent, withdrawn, diverted, or received by the provider during the year by 10 percent.*

9. *Add the results from paragraphs 1 through 7 of this subsection and then divide the sum by the provider's annual service area population as of July 1 of that year. The quotient is the provider's total GPCD requirement for the calendar year.* ***See Appendices 5C.1 and 5C.2 for an example of this calculation.***

C. Compliance with Total GPCD Requirement

The director shall determine if a large municipal provider is in compliance with its total GPCD requirement for a calendar year pursuant to the flexibility account provisions in

section 5-106, using the provider's service area population as calculated in subsection D of this section.

D. Calculation of Large Municipal Provider's Service Area Population

The director shall calculate a large municipal provider's service area population for a calendar year as follows, unless the director has approved an alternative methodology for calculating the provider's service area population prior to the calendar year in question:

1. *Determine the number of existing single family housing units and existing multifamily housing units served by the provider's distribution system as of July 1, 2000 less any existing single family housing units and any existing multifamily housing units removed from the provider's distribution system between July 1, 2000 and June 30 of the calendar year in question.*

2. *Adjust these totals by the respective average annual vacancy rate for single family housing units and multifamily housing units as calculated from the most recent census or other approved source of information.*

3. *Multiply the adjusted number of existing single family housing units calculated in paragraph 2 of this subsection by the average number of persons per occupied single family housing unit as calculated in accordance with the most recent census or other approved source of information.*

4. *Multiply the adjusted number of existing multifamily housing units calculated in paragraph 2 of this subsection by the average number of persons per occupied multifamily housing unit as calculated in accordance with the most recent census or other approved source of information.*

5. *Add the products from paragraphs 3 and 4 of this subsection. The sum is the provider's existing residential population.*

6. *Determine the number of new single family housing units and new multifamily housing units added to the provider's distribution system between July 1 of the previous calendar year and July 1 of the calendar year in question, less any new single family and new multifamily housing units removed from the system during that period.*

7. *Adjust these totals by the respective average annual vacancy rate for single family housing units and multifamily housing units as calculated from the most recent census or other approved source of information.*

8. *Multiply the adjusted number of new single family housing units calculated in paragraph 7 of this subsection by the average number of persons per occupied single family housing unit as calculated in accordance with the most recent census or other approved source of information.*

9. *Multiply the adjusted number of new multifamily housing units calculated in paragraph 7 of this subsection by the average number of persons per occupied multifamily housing unit as calculated in accordance with the most recent census or other approved source of information.*

10. *Add the product from paragraph 8 to the provider's new single family population as of July 1 of the previous year and add the product from paragraph 9 to the provider's new multifamily population as of July 1 of the previous year. The sums are the provider's new single family population and new multifamily population.*

11. *Add the results from paragraphs 5 and 10. The sum is the provider's service area population for the calendar year.*

5-104. Non-Per Capita Conservation Program

A. Eligibility for the Non-Per Capita Conservation Program

A large municipal provider may apply for the NPCCP if any of the following applies:

1. *The provider is a member of a groundwater replenishment district established under Title 48, Chapter 27, Arizona Revised Statutes.*

2. *The service area of the provider has qualified as a member service area under Title 48, Chapter 22, Arizona Revised Statutes, or as a water district member under Title 48, Chapter 28, Arizona Revised Statutes, and the conditions established under A.R.S. § 45-576.01(B)(2) and (3) are met by the conservation district or the water district, as applicable, for the AMA in which the service area is located.*

3. *The provider has developed a plan to both:*

    a. *Reduce the proportion of mined groundwater supplied by it for use within its service area such that the result computed by dividing the volume of mined groundwater supplied by the provider for use within its service area in a year by the volume of all water supplied by the provider for use within its service area in that year does not exceed:*

        1) Two-thirds for 2000.
        2) Three-fifths for 2001.
        3) Eight-fifteenths for 2002.
        4) Seven-fifteenths for 2003.
        5) Two-fifths for 2004.
        6) One-third for 2005.
        7) Four-fifteenths for 2006.
        8) One-fifth for 2007.
        9) Two-fifteenths for 2008.
        10) One-fifteenth for 2009.

    b. *Deliver no mined groundwater for use within its service area after January 1, 2010.*

4. *The provider is designated as having an assured water supply under rules adopted by the director pursuant to A.R.S. § 45-576.*

B. Application for Non-Per Capita Conservation Program

A large municipal provider's application for the NPCCP must be approved by the provider's governing body and must include the following:

1. *A description and evaluation, including implementation dates, of the provider's existing conservation programs.*

2. *A description of conservation programs the provider intends to implement if approved for the NPCCP, including a time schedule for implementing the programs.*

3. *If the provider is applying for the NPCCP under subsection A, paragraph 3, a water supply plan demonstrating that the provider will reduce the proportion of mined groundwater supplied by it within its service area to the proportions described in that subparagraph and that it will deliver no mined groundwater after January 1, 2010.*

4. *If the provider intends to comply with subsection D of this section by implementing one or more substitute RCMs in lieu of a standard RCM or if the provider requests the director to modify a level of conservation potential for the provider's service area pursuant to subsection D, paragraph 1, subparagraph a of this section, an analysis of water use within the provider's service area which includes all of the following:*

    a. *If the provider intends to implement one or more substitute RCMs, information demonstrating that the substitute RCM or RCMs will be designed to achieve a water use efficiency within the provider's service area equivalent to the efficiency that would result from implementation of the standard RCM or RCMs.*

    b. *The amount of water used each month during the past three years by each of the following water use sectors, as applicable: (1) residential (disaggregated by single family and multifamily), (2) commercial, (3) industrial, (4) turf-related facilities, (5) government, (6) construction, (7) distribution system losses, and (8) any other uses. The provider is not required to include this information if it has already been reported to the Department.*

    c. *An identification and evaluation of the water use sectors described in paragraph b of this subparagraph that have the highest water conservation potential.*

5. *If the provider is requesting an individual incidental recharge factor under subsection C, paragraph 2 of this section:*

    a. *A copy of a hydrological study which demonstrates the amount of water withdrawn, diverted, or received for delivery by the provider for use within its service area during each of the preceding five years and the amount of incidental recharge that was attributable to the provider during those years. The study shall be prepared consistent with the methodology contained in Appendix 5K.*

    b. *A copy of a hydrological study projecting the average annual amount of water that will be withdrawn, diverted, or received for delivery by the provider for use within its service area during the management period and the average annual amount of incidental recharge that will be attributable to the provider during the management period.*

6. *Any other information required by the director.*

*C. **Incidental Recharge Factor***

1. Standard Incidental Recharge Factor

The standard incidental recharge factor for the Santa Cruz AMA for the third management period is 0 percent. The standard incidental recharge factor shall be used to calculate the amount of mined groundwater supplied during a year by a large municipal provider that applied for the NPCCP under subsection A, paragraph 3 of this section, unless the provider applies for and is granted an individual incidental recharge factor pursuant to paragraph 2 of this subsection.

2. Individual Incidental Recharge Factor

A large municipal provider that applies for the NPCCP under subsection A, paragraph 3 of this section, may request an incidental recharge factor that is different than the standard incidental recharge factor set forth in paragraph 1 of this subsection by submitting the information described in subsection B, paragraph 5 of this section, with its application. The director shall establish a different incidental recharge factor for the provider as described in Appendix 5K if the information submitted by the provider demonstrates that the ratio of the average annual amount of incidental recharge expected to occur within the provider's service area during the third management period to the average annual amount of water expected to be supplied by the provider for use within its service area during the third management period is different than the standard incidental recharge factor. If the director establishes an individual incidental recharge factor for the provider under this paragraph, the individual incidental recharge factor shall be used to calculate the amount of mined groundwater supplied by the provider during a year.

*D. **Criteria for Approval of Application***

A large municipal provider that applies for the NPCCP shall be approved for the program only if all of the following conditions are satisfied, as applicable:

1. The provider agrees in writing to implement RCMs that the director determines will, if properly implemented, result in the achievement of a water use efficiency within the provider's service area equivalent to the water use efficiency assumed in the provider's total GPCD requirements for the third management period. To comply with this requirement, the provider must agree in writing to implement the following RCMs for the following water use categories and programs beginning on a date agreed upon by the director and the provider:

a. Residential Water Use

1) <u>Residential interior water use category</u> - The provider shall agree in writing to implement the residential interior standard RCMs described in Appendix 5H.1. In lieu of implementing one or both of the standard RCMs, the provider may agree to implement one or more of the residential interior substitute RCMs or system-related substitute RCMs listed in the substitute RCM list described in Appendix 5H.4 if the director determines that the substitute RCM or RCMs will be designed to achieve a water use efficiency within the provider's service area equivalent to the efficiency that would result from implementation of the standard RCM.

2) *Residential exterior water use category - The provider shall agree in writing to implement the residential exterior standard RCMs described in Appendix 5H.1. In lieu of implementing one or more of the standard RCMs, the provider may agree to implement one or more of the residential exterior substitute RCMs or system-related substitute RCMs listed in the substitute RCM list described in Appendix 5H.4 if the director determines that the substitute RCM or RCMs will be designed to achieve a water use efficiency within the provider's service area equivalent to the efficiency that would result from implementation of the standard RCM.*

3) *Implementation level - The provider shall agree to implement residential interior or exterior RCMs for existing residential customers at the implementation level (minimum, moderate, or maximum) that corresponds to the level of conservation potential that the director determined existed for interior and exterior water use by existing residential users within the provider's service area when the director established the provider's total GPCD requirements for the third management period, as shown in Appendix 5L.*

The director may modify a level of conservation potential shown for a provider in Appendix 5L if the provider requests a modification in an application for administrative review pursuant to A.R.S. § 45-575(A) or in the provider's application for regulation under the NPCCP, and the provider demonstrates that the level of conservation potential shown in Appendix 5L is not accurate for the provider's service area. A provider requesting a modification of a level of conservation potential shall submit to the director a water use analysis containing the information described in subsection B, paragraph 4 of this section. If the level of conservation potential for interior or exterior water use by existing residential users as shown in Appendix 5L or as modified by the director is "no reduction," the provider is not required to implement any RCMs for existing residential customers in that water use category.

b. *Non-Residential Water Use*

1) *Non-residential interior water use category - The provider shall agree in writing to implement the non-residential interior standard RCMs described in Appendix 5H.2. In lieu of implementing one or more of the standard RCMs, the provider may agree to implement one or more of the non-residential interior substitute RCMs or system-related RCMs listed in the substitute RCM list described in Appendix 5H.4 if the director determines that the substitute RCM or RCMs will be designed to achieve a water use efficiency within the provider's service area equivalent to the efficiency that would result from implementation of the standard RCM.*

2) *Non-residential exterior water use category - The provider shall agree in writing to implement the non-residential exterior standard RCMs described in Appendix 5H.2. In lieu of implementing one or both of the standard RCMs, the provider may agree to implement one or more of the non-residential exterior substitute RCMs or system-related RCMs listed in the substitute RCM list described in Appendix 5H.4 if the director determines that the substitute RCM or RCMs will be designed to achieve a water use efficiency within the provider's service area equivalent to the efficiency that would result from implementation of the standard RCM.*

c. *Public Education Program*

The provider shall agree in writing to implement the education standard RCM described in Appendix 5H.3. In lieu of implementing the standard RCM, the provider may agree to implement one or more of the education substitute RCMs listed in the substitute RCM list described in Appendix 5H.4. The substituted RCM or RCMs must not duplicate other RCMs that the provider will implement as part of the NPCCP.

2. *If the provider is applying for the NPCCP under subsection A, paragraph 1 of this section, the provider will be accepted into the program only if the conditions established in A.R.S. § 45-576.01(A)(2) and (3) are met by the groundwater replenishment district of which the provider is a member.*

3. *If the provider is applying for the NPCCP under subsection A, paragraph 2 of this section, the provider will be accepted into the program only if the conditions established in A.R.S. § 45-576.01(B)(2) and (3) are met for the AMA by the multi-county water conservation district or AMA water district of which the provider is a member.*

4. *If the provider is applying for the NPCCP under subsection A, paragraph 3 of this section, the provider will be accepted into the program only if the director has determined that the provider will reduce the proportion of mined groundwater supplied within its service area to the proportions described in that subparagraph.*

5. *If the provider is applying for the NPCCP under subsection A, paragraph 4 of this section, the provider will be accepted into the program only if the director determines that the provider is designated as having an assured water supply under the rules adopted by the director under A.R.S. § 45-576.*

E. Non-Per Capita Conservation Program Requirements

A large municipal provider regulated under the NPCCP shall comply with the following requirements, as applicable, until the effective date of any substitute conservation requirements established in the Fourth Management Plan:

1. *The provider shall implement the RCMs agreed to in writing under subsection D, paragraph 1 of this section, beginning on a date agreed upon by the director and the provider.*

2. *If the provider applied for the NPCCP under subsection A, paragraph 3 of this section, the provider shall reduce the proportion of mined groundwater supplied within its service area to the proportions described in that paragraph. A provider's failure to comply with this requirement during any year will be excused if the provider demonstrates to the director's satisfaction that the failure was due to drought conditions or the failure of a surface water distribution system.*

3. *If the provider applied for the NPCCP under subsection A, paragraph 4 of this section, the provider shall not supply groundwater for use within its service area in an amount that exceeds the amount of groundwater that the provider may supply for use within its service area consistent with the rules adopted by the director pursuant to A.R.S. § 45-576. If the provider's Designation of AWS is revoked or otherwise terminates after the provider is accepted into the program, the amount of groundwater the provider may supply for use within its service area consistent with the rules shall be determined by the director as the*

amount of groundwater the provider would have been allowed to supply under the rules if the provider's Designation of AWS had not been revoked or terminated.

5-105. Alternative Conservation Program

A. Eligibility for the Alternative Conservation Program

A large municipal provider is eligible to apply for the ACP if one of the following applies:

1. *The provider is designated as having an assured water supply under rules adopted by the director pursuant to A.R.S. § 45-576.*

2. *The provider agrees that it will not withdraw or use water, other than stored water, from a well unless the withdrawal or use would be allowed under the consistency with management goal provisions of the Assured Water Supply Rules adopted by the director under A.R.S. § 45-576 as if the provider was designated as having an assured water supply under those rules.*

B. Application for Alternative Conservation Program

A large municipal provider's application for the ACP must be approved by the provider's governing body and must include the following:

1. *A demonstration of consistency with the Santa Cruz AMA management goal as required by subsection C, paragraph 1 of this section.*

2. *A description and evaluation, including implementation dates, of the provider's existing conservation programs.*

3. *A description of the proposed conservation strategies for all existing and new non-residential customers to be implemented by the provider under this program and the provider's schedule for implementation of all proposed conservation measures.*

4. *If the provider intends to comply with subsection C, paragraph 3 of this section, by implementing one or more substitute non-residential RCMs in lieu of a standard non-residential RCM, an analysis of water use within the provider's service area which includes all of the following:*

    a. *A demonstration that the substituted RCM or RCMs will be designed to achieve a water use efficiency within the provider's service area equivalent to the efficiency that would result from implementation of the standard RCM.*

    b. *The amount of water used each month during the past three years by each of the following water use sectors, as applicable: (1) residential (disaggregated by single family and multifamily), (2) commercial, (3) industrial, (4) turf-related facilities, (5) government, (6) construction, (7) distribution system losses, and (8) any other uses. The provider is not required to include this information if it has already been reported to the Department.*

    c. *An identification and evaluation of the water use sectors described in subparagraph b of this paragraph that have the highest water conservation potential.*

*C. **Alternative Conservation Program Requirements***

1. Consistency With AMA Management Goal Requirement

a. Beginning with a calendar year agreed upon by the director and a large municipal provider regulated under the Alternative Conservation Program, and for each calendar year thereafter until the first compliance date for any substitute requirement in the Fourth Management Plan, the provider shall not withdraw or use water, other than stored water, from a well unless the withdrawal or use complies with the following, as applicable:

1) If the provider is designated as having an assured water supply under the rules adopted by the director pursuant to A.R.S. § 45-576, the withdrawal or use would be allowed under the consistency with management goal provisions of Rule R12-15-705, Arizona Administrative Code.

2) If the provider is not designated as having an assured water supply under the rules adopted by the director pursuant to A.R.S. § 45-576, the withdrawal or use would be allowed under the consistency with management goal provisions of Rule R12-15-705, Arizona Administrative Code, as if the provider was designated as having an assured water supply under the rules.

b. Compliance

The director shall determine whether a large municipal provider is in compliance with its consistency with AMA management goal requirements, as described in subparagraph a, item 2 of this paragraph in a calendar year in the same manner as if the provider were designated as having an assured water supply.

2. Residential GPCD Requirement

a. Beginning with a calendar year agreed upon by the director and a large municipal provider regulated under the ACP and for each calendar year thereafter until the first compliance date for any substitute requirement in the Fourth Management Plan, the provider shall not serve water from any source, except direct use effluent and effluent recovered within the area of impact, for residential use during a calendar year in a total amount that exceeds its residential GPCD requirement for the year, except as provided in the flexibility account provisions in section 5-106. Each year the annual residential GPCD requirement for a provider regulated under the ACP shall be calculated as follows:

1) For each calendar year through 2004, multiply the provider's existing residential population for the year, as calculated pursuant to section 5-103, subsection D, by the first intermediate GPCD component for existing residential population as assigned to the provider in Table 5-5.

For calendar years 2005 through 2009, multiply the provider's existing residential population for the year, as calculated pursuant to section 5-103, subsection D, by the second intermediate GPCD component for existing residential population as assigned to the provider in Table 5-5.

For the calendar year 2010 and for each calendar year thereafter until the first compliance date for any substitute GPCD requirement in the Fourth Management Plan, multiply the provider's existing residential population for the year, as calculated pursuant to section 5-103, subsection D, by the final GPCD component for existing residential population as assigned to the provider in Table 5-5.

2) *Multiply the provider's new single family population for the year, as calculated pursuant to section 5-103, subsection D, by 57 GPCD.*

3) *Multiply the number of new single family housing units within the provider's service area as of July 1 of the calendar year in question by 107 GPHUD.*

4) *Multiply the provider's new multifamily population for the year, as calculated pursuant to section 5-103, subsection D, by 57 GPCD.*

5) *Multiply the number of new multifamily housing units within the provider's service area as of July 1 of the calendar year in question by 26 GPHUD.*

6) *Add the products from items 1 through 4 of this subparagraph and then divide the sum by the provider's service area population as of July 1 of the calendar year. The quotient is the provider's residential GPCD requirement for the calendar year.*

b. *Compliance with Residential GPCD Requirement*

The director shall determine if a large municipal provider regulated under the ACP is in compliance with its residential GPCD requirement pursuant to the flexibility account provisions in section 5-106.

3. *Non-Residential Requirement*

a. *A large municipal provider regulated under the ACP shall agree in writing to implement the following non-residential RCMs beginning on a date agreed upon by the director and the provider:*

1) *<u>Non-Residential Interior Requirements</u> - The provider shall agree in writing to implement the non-residential interior standard RCMs described in Appendix 5H.2. In lieu of implementing one or more of the standard RCMs, the provider may agree to implement one or more of the non-residential interior substitute RCMs or system-related RCMs listed in the substitute RCM list described in Appendix 5H.4 if the director determines that the substitute RCM or RCMs will be designed to achieve a water use efficiency within the provider's service area equivalent to the efficiency that would result from implementation of the standard RCM.*

2) *<u>Non-Residential Exterior Requirements</u> - The provider shall agree in writing to implement the non-residential exterior standard RCMs described in Appendix 5H.2. In lieu of implementing one or both of the standard RCMs, the provider may agree to implement one or more of the non-residential exterior substitute RCMs or system-related RCMs listed in the substitute RCM list described in Appendix 5H.4 if the director determines that the substitute RCM or RCMs will*

be designed to achieve a water use efficiency within the provider's service area equivalent to the efficiency that would result from implementation of the standard RCM.

5-106. Compliance with Total GPCD Requirement and Residential GPCD Requirement - Flexibility Account

A. Total GPCD Program Flexibility Account

The director shall determine if a large municipal provider regulated under the Total GPCD Program is in compliance with its annual total GPCD requirement through the maintenance of a flexibility account for the provider which shall operate as follows:

1. *Each provider regulated under the Total GPCD Program shall be assigned a flexibility account. The beginning balance in the flexibility account of a provider that was regulated under the Total GPCD Program in the Second Management Plan shall be the ending balance in the flexibility account maintained for the provider under section 5-105 of the Second Management Plan. The beginning balance in the flexibility account of all other large municipal providers shall be zero.*

2. *Following each calendar year in which the provider withdraws or receives water, other than stored water, from wells for non-irrigation use, beginning with the calendar year determined under section 5-103, subsection A, paragraph 2 or the calendar year in which the provider first becomes a large municipal provider, whichever is later, the director shall adjust the provider's flexibility account as follows:*

   a. *Determine the total gallons of water from any source, except direct use effluent and effluent recovered inside the area of impact, withdrawn, diverted, or received by the provider during the calendar year for non-irrigation use, and then subtract that amount from the amount of water the provider could legally withdraw, divert, or receive during the calendar year for non-irrigation use, as calculated in subparagraph d of this paragraph.*

   b. *If the result in subparagraph a above is negative, debit the flexibility account by this volume.*

   c. *If the result in subparagraph a above is positive, credit the flexibility account by this volume.*

   d. *The amount of water which a provider regulated under the Total GPCD Program can legally withdraw, divert, or receive for non-irrigation use during a calendar year is calculated by multiplying the provider's total GPCD requirement for the calendar year, as calculated pursuant to section 5-103, subsection B, by the provider's service area population as of July 1 of the year, as calculated pursuant to section 5-103, subsection D, and then multiplying the product by the number of days in the calendar year.*

3. *The account balance existing in a provider's flexibility account after the adjustment provided for in paragraph 2 of this subsection is made shall carry forward subject to the following limitations:*

a. *The maximum positive account balance allowed in the flexibility account of a provider regulated under the Total GPCD Program shall be calculated by multiplying the provider's service area population as of July 1 of the calendar year by a GPCD rate of 30 and then multiplying that product by the number of days in the calendar year. If the account balance exceeds the maximum positive account balance after any credits are registered, the balance carried forward shall equal the maximum positive account balance allowed in the provider's flexibility account for that year.*

b. *The maximum negative account balance allowed in the flexibility account of a provider regulated under the Total GPCD Program shall be calculated by multiplying the provider's service area population as of July 1 of the calendar by a GPCD rate of -10 and then multiplying that product by the number of days in the calendar year. If the account balance exceeds the maximum negative account balance after any debits are registered, the balance carried forward shall equal the maximum negative account balance allowed in the provider's flexibility account for that year.*

B. Alternative Conservation Program Flexibility Account

The director shall determine if a large municipal provider regulated under the ACP is in compliance with its annual residential GPCD requirement through the maintenance of a flexibility account for the provider which shall operate as follows:

1. *Each provider regulated under the ACP shall be assigned a flexibility account with a beginning balance to be calculated by the director based on the ending balance in the provider's flexibility account while the provider was regulated under the Total GPCD Program or under the ACP of the Second Management Plan, whichever applies.*

2. *Following each calendar year in which the provider delivers water, other than stored water, withdrawn from wells for residential use, beginning with the calendar year agreed upon by the director and the provider, the director shall adjust the provider's flexibility account balance as follows:*

   a. *Determine the total gallons of water from any source, except direct use effluent and effluent recovered within the area of impact, served by the provider during the calendar year for residential use, and then subtract that amount from the amount of water the provider could legally serve during the calendar year for residential use, as calculated in subparagraph d of this paragraph.*

   b. *If the result in paragraph a above is negative, debit the flexibility account by this volume.*

   c. *If the result in paragraph a above is positive, credit the flexibility account by this volume.*

   d. *The amount of water which a provider regulated under the ACP can legally serve for residential use during a calendar year is calculated by multiplying the provider's residential GPCD requirement for the calendar year, as calculated pursuant to section 5-105, subsection C, paragraph 2, by the provider's service area population as of July 1 of the year as calculated pursuant to section 5-103, subsection D, and then multiplying the product by the number of days in the calendar year.*

3. *The account balance existing in a provider's flexibility account after the adjustment provided for in paragraph 2 of this subsection is made shall carry forward subject to the following limitations:*

   a. *The maximum positive account balance allowed in the flexibility account of a provider regulated under the ACP shall be calculated by multiplying the provider's service area population as of July 1 of the calendar year by a GPCD rate of 21 and then multiplying that product by the number of days in the calendar year. If the account balance exceeds the maximum positive account balance after any credits are registered, the balance carried forward shall equal the maximum positive account balance allowed in the provider's flexibility account for that year.*

   b. *The maximum negative account balance allowed in the flexibility account of a ~~large~~ provider regulated under the ACP shall be calculated by multiplying the provider's service area population as of July 1 of the calendar year by a GPCD rate of -7 and then multiplying that product by the number of days in the calendar year. If the account balance exceeds the maximum negative account balance after any debits are registered, the balance carried forward shall equal the maximum negative account balance allowed in the provider's flexibility account for that year.*

C. Compliance Status

If the adjustment to a large municipal provider's flexibility account following a calendar year as provided for in subsection A or B of this section causes the account to have a negative account balance which exceeds the maximum negative account balance allowed in the provider's flexibility account for the year as calculated in subsection A, paragraph 3, or subsection B, paragraph 3, the provider is out of compliance for that calendar year.

5-107. Conservation Requirements for Institutional Providers

A. *If a large municipal provider operates primarily for the purpose of serving water to institutions, including prisons, hospitals, military installations, airparks, and schools, and supplies or expects to supply more than 90 percent of its total non-irrigation deliveries to one or more of these institutions, the provider may apply to the director for designation as an institutional provider. The director may deem a facility other than one of those listed above as an institution if its water use characteristics are similar to the types of institutions listed above.*

B. *A large municipal provider regulated as an institutional provider in the Second Management Plan may reapply to the director to be designated as an institutional provider under the Third Management Plan any time after it has been noticed of its total GPCD requirements for the Third Management Plan.*

C. *A large municipal provider applying for designation as an institutional provider shall apply on a form prescribed and furnished by the director. The large provider shall provide information in sufficient detail to allow the director to evaluate the provider's conservation potential and to establish appropriate conservation requirements for the provider.*

D. *The director shall approve a large municipal provider's application for designation as an institutional provider if the provider meets the criteria in subsection A of this section and demonstrates that it does not qualify for the NPCCP or the ACP.*

E. Each large municipal provider designated as an institutional provider shall be assigned mandatory conservation requirements and monitoring and reporting requirements, including a maximum residential GPCD requirement and appropriate conservation measures for non-residential uses. The institutional provider shall comply with the assigned conservation requirements by the date specified by the director, but not later than January 1 of the year following the year in which the provider's application is approved, and shall remain in compliance with those requirements until the first compliance date for any substitute requirements in the Fourth Management Plan.

5-108. Consolidation of Municipal Provider Service Areas; Acquisition of a Portion of Another Municipal Provider's Service Area

A. Notification

1. *If two or more municipal providers consolidate their service areas into one service area, the consolidated provider shall notify the Department of the consolidation within 30 days after the consolidation becomes effective.*

2. *If a municipal provider acquires a portion of another municipal provider's existing service area, both the acquiring provider and the conveying provider shall notify the Department of the acquisition within 30 days after the acquisition becomes effective.*

B. Regulation of Consolidated Provider

1. *Upon consolidation, a consolidated provider that qualifies as a large municipal provider shall be regulated under the Total GPCD Program described in section 5-103, unless the consolidated provider applies for and is accepted for regulation under the NPCCP described in section 5-104 or the ACP described in section 5-105.*

2. *If the consolidated provider is regulated under the Total GPCD Program, the director shall establish a total GPCD requirement for the consolidated provider consistent with the methodology used by the director to establish the consolidating providers' total GPCD requirements as set forth in Appendix 5C.1. The director shall also establish and maintain a flexibility account for the consolidated provider in accordance with section 5-106, subsection A, with a beginning balance to be established by the director based on the ending balances in the flexibility accounts of the consolidating providers.*

3. *If the consolidated provider is accepted for regulation under the ACP, the director shall establish a residential GPCD requirement for the consolidated provider consistent with the methodology used by the director to establish the consolidating providers' residential GPCD requirements as set forth in Appendix 5I. The director shall also establish and maintain a flexibility account for the consolidated provider in accordance with section 5-106, subsection B, with a beginning balance to be established by the director based on the ending balances in the flexibility accounts of the consolidating providers.*

4. *If the consolidated provider applies for regulation under the NPCCP or the ACP and one of the consolidating providers was regulated under that program immediately prior to consolidation, the consolidated provider's application for regulation under the program shall include only the information required by section 5-104 or section 5-105 that has changed since the consolidating provider filed its application for the program.*

*C. **Regulation of Acquiring Provider***

1. *Except as provided in paragraph 2 of this subsection, a large municipal provider that acquires a portion of another provider's existing service area shall continue to be regulated under the conservation program that the acquiring provider was regulated under immediately prior to the acquisition.*

2. *If the acquiring provider was regulated under either the NPCCP described in section 5-104 or the ACP described in section 5-105 immediately prior to the acquisition, the acquiring provider shall be regulated under the Total GPCD Program beginning on January 1 of the first calendar year after the acquisition unless the provider reapplies to be regulated under the NPCCP or the ACP, whichever is applicable, within 180 days after the acquisition. If the acquiring provider reapplies to be regulated under the NPCCP or the ACP within 180 days after the acquisition, both of the following shall apply:*

   a. *The provider shall continue to be regulated under the NPCCP or the ACP, whichever is applicable, until the director makes a final decision on the provider's application.*

   b. *The acquiring provider's application shall include only the information required by section 5-104 or section 5-105 that has changed since the provider filed its original application for the program.*

3. *If the acquiring provider is regulated under the Total GPCD Program after the acquisition, the director shall establish a new total GPCD requirement for the provider consistent with the methodology used to establish the provider's total GPCD requirement in Appendix 5C.1, taking into account the addition to the provider's service area. The director may also adjust the balance in the acquiring provider's flexibility account maintained under section 5-106, subsection A, to take into account the balance in the conveying provider's flexibility account at the time of the conveyance.*

4. *If the acquiring provider is regulated under the ACP after the acquisition, the director shall establish a new residential GPCD requirement for the provider consistent with the methodology used to establish the residential GPCD requirements in Appendix 5I, taking into account the addition to the provider's service area. The director may also adjust the balance in the acquiring provider's flexibility account maintained under section 5-106, subsection A, to take into account the balance in the conveying provider's flexibility account at the time of the conveyance.*

*D. **Regulation of Conveying Provider***

1. *Except as provided in paragraph 2 of this subsection, a large municipal provider that conveys a portion of its service area to another provider and that qualifies as a large municipal provider after the conveyance shall continue to be regulated under the conservation program that the provider was regulated under immediately prior to the conveyance.*

2. *If the conveying provider was regulated under either the NPCCP described in section 5-104 or the ACP described in section 5-105 immediately prior to the acquisition and if the conveying provider qualifies as a large municipal provider after the conveyance, the conveying provider shall be regulated under the Total GPCD Program beginning on January 1 of the first calendar year after the acquisition unless the provider reapplies to*

be regulated under the NPCCP Program or the ACP, whichever is applicable, within 180 days after the conveyance. If the conveying provider reapplies to be regulated under the NPCCP or the ACP within 180 days after the conveyance, both of the following shall apply:

a. The provider shall continue to be regulated under the NPCCP or the ACP, whichever is applicable, until the director makes a final decision on the provider's application.

b. The provider's application shall include only the information required by section 5-104 or section 5-105 that has changed since the provider filed its original application for the program.

3. If the conveying provider is regulated under the Total GPCD Program after the conveyance, the director shall establish a new total GPCD requirement for the provider consistent with the methodology used to establish the total GPCD requirements in Appendix 5C.1, taking into account the reduction in the provider's service area. The director may also adjust the balance in the conveying provider's flexibility account maintained under section 5-106 to take into account the reduction in the provider's service area.

4. If the conveying provider is regulated under the ACP after the conveyance, the director shall establish a new residential GPCD requirement for the provider consistent with the methodology used to establish the residential GPCD requirements in Appendix 5I, taking into account the reduction in the provider's service area. The director may also adjust the balance in the conveying provider's flexibility account maintained under section 5-106 to take into account the reduction in the provider's service area.

5-109. Conservation Requirements for New Large Municipal Providers

A. Total GPCD Program

1. A new large municipal provider shall be assigned to the Total GPCD Program described in section 5-103 and shall comply with its annual total GPCD requirement no later than the second full calendar year after the provider is given written notice of the requirement by the director and for each calendar year thereafter until the first compliance date for any substitute requirement in the Fourth Management Plan.

2. A new large municipal provider's total GPCD requirement for a year shall be calculated as follows:

a. For calendar years 2002 through 2004, multiply the provider's existing residential population for the year, as calculated pursuant to section 5-103, by the provider's first intermediate GPCD component for existing residential population as determined by the director after the provider qualifies as a new large provider. In determining the provider's first intermediate GPCD component for existing residential population, the director shall assume the implementation of conservation measures appropriate for the characteristics of the provider's existing service area population for calendar years 2002 through 2004, taking into consideration already existing conservation measures.

For calendar years 2005 through 2009, multiply the provider's existing residential population for the year, as calculated pursuant to section 5-103, by the provider's

second intermediate GPCD component for existing residential population as determined by the director after the provider qualifies as a new large provider. In determining the provider's second intermediate GPCD component for existing residential population, the director shall assume the implementation of conservation measures appropriate for the characteristics of the provider's existing service area population for calendar years 2005 through 2009, taking into consideration already existing conservation measures.

For the calendar year 2010 and for each calendar year thereafter until the first compliance date for any substitute total GPCD requirement in the Fourth Management Plan, multiply the provider's existing residential population for the year, as calculated pursuant to section 5-103, by the provider's final GPCD component for existing residential population as determined by the director after the provider qualifies as a new large provider. In determining the provider's final GPCD component for existing residential population, the director shall assume the implementation of conservation measures appropriate for the characteristics of the provider's existing service area population beginning in calendar year 2010, taking into consideration already existing conservation measures.

b. *Multiply the provider's new single family population for the year, as calculated pursuant to subsection D of section 5-103, by 57 GPCD.*

c. *Multiply the number of new single family housing units within the provider's service area as of July 1 of the calendar year by 107 GPHUD.*

d. *Multiply the new multifamily population for the year, as calculated pursuant to subsection D of section 5-103, by 57 GPCD.*

e. *Multiply the number of new multifamily housing units within the provider's service area as of July 1 of the calendar year by 26 GPHUD.*

f. *Determine the provider's non-residential GPCD by dividing the total non-residential water delivered, in gallons, during the calendar year by the service area population for the calendar year, as calculated pursuant to subsection D of section 5-103, and dividing by the number of days in the calendar year. The non-residential GPCD component equals the non-residential GPCD rate for the calendar year up to 21 GPCD. If the non-residential GPCD rate for the calendar year is greater than 21 GPCD, the non-residential component shall be 21 GPCD.*

g. *Divide the provider's allowable lost and unaccounted for water by the number of days in the calendar year. The provider's allowable lost and unaccounted for water is the lesser of the following:*

   1) *the provider's actual lost and unaccounted for water for the year, in gallons.*

   2) *an amount calculated by multiplying the total gallons of water from any source, except direct use effluent, withdrawn, diverted, or received by the provider during the year for non-irrigation uses by 10 percent.*

h. *Add the results from paragraphs a through g of this section and then divide the sum by the provider's annual service area population as of July 1 of that year, as*

determined pursuant to section 5-103, subsection D. The quotient is the provider's total GPCD requirement for the calendar year.

3. *The director shall determine if a new large municipal provider is in compliance with its annual total GPCD requirement pursuant to the flexibility account provisions in section 5-106.*

B. Non-Per Capita Conservation Program

A new large municipal provider may apply for regulation under the NPCCP in accordance with section 5-104.

C. Alternative Conservation Program

1. *Application*

   A new large municipal provider may apply for regulation under the ACP in accordance with section 5-105.

2. *Consistency with AMA Management Goal Requirement*

   A new large municipal provider regulated under the Alternative Conservation Program shall comply with the consistency with AMA management goal requirements set forth in Section 5-105, subsection C, paragraph 1.

3. *Annual Residential GPCD Requirement*

   a. *Requirement*

      A new large municipal provider regulated under the ACP shall comply with its annual residential GPCD requirement for each calendar year as described in section 5-105, subsection C, paragraph 2, subparagraph a.

   b. *Calculation of Annual Residential GPCD Requirement*

      Each year the annual residential GPCD requirement for a new large municipal provider regulated under the ACP shall be calculated as follows:

      1) *Multiply the provider's existing residential population for the year, as calculated pursuant to section 5-103, subsection D, by the GPCD component for existing residential population as determined by the director. The GPCD components shall assume the implementation of conservation measures appropriate for the characteristics of the provider's service area, taking into consideration already existing conservation measures.*

      2) *Multiply the provider's new single family population for the year, as calculated pursuant to section 5-103, subsection D, by 57 GPCD.*

      3) *Multiply the number of new single family housing units within the provider's service area as of July 1 of the calendar year in question by 107 GPHUD.*

4) *Multiply the new multifamily population for the year, as calculated pursuant to subsection D of section 5-103, by 57 GPCD.*

5) *Multiply the number of new multifamily housing units within the provider's service area as of July 1 of the calendar year in question by 26 GPHUD.*

6) *Add the products from items 1 through 5 of this subparagraph and then divide the sum by the provider's service area population as of July 1 of the calendar year. The quotient is the provider's residential GPCD requirement for the calendar year.*

c. *Compliance with Annual Residential GPCD Requirement*

The director shall determine if a new large municipal provider regulated under the ACP is in compliance with its annual residential GPCD requirement pursuant to the flexibility account provisions in section 5-106.

4. *Non-Residential Conservation Programs*

A new large municipal provider regulated under the ACP shall implement conservation programs for its non-residential customers in accordance with section 5-105, subsection C, paragraph 3.

5-110. Conservation Requirements for Small Municipal Providers

By January 1, 2002 or upon commencement of service of water, whichever is later, and until the first compliance date for any substitute requirements in the Fourth Management Plan, a small municipal provider shall adopt and implement a program to achieve the following goals:

1. *Minimize waste of all water supplies.*

2. *Maximize efficiency in outdoor watering.*

3. *Encourage reuse of water supplies.*

4. *Reduce its total GPCD usage.*

5-111. Individual User Requirements for Municipal Providers and Individual Users

A. Individual User Requirements

Beginning January 1, 2002, or upon commencement of service of water, whichever is later, and for each calendar year thereafter until the first compliance date for any substitute requirement in the Fourth Management Plan, the municipal provider or individual user responsible for compliance with the individual user requirements under subsection B of this section shall comply with the following, as applicable:

1. *The municipal provider or individual user shall serve water to, or use water within, a turf-related facility only in accordance with sections 6-302 through 6-305 of the Industrial Chapter of the Third Management Plan, and shall comply with the monitoring and reporting requirements set forth in section 6-203 of the Industrial Chapter, as though*

the individual user were an industrial user. The person responsible for compliance shall also comply with the requirements contained in section 6-202 of the Industrial Chapter, if applicable, as though the individual user were an industrial user.

2. *The municipal provider or individual user shall serve or use water, other than stored water, withdrawn from a well for the purpose of watering landscaping plants planted on or after January 1, 1987 within any publicly owned rights-of-way of a highway, street, road, sidewalk, curb or shoulder which is used for travel in any ordinary mode, including pedestrian travel, only if the plants are listed in Appendix 5B. The director may waive this requirement upon request from the municipal provider or individual user if a waiver of this requirement is in the public interest. This requirement does not apply to any portion of a residential lot that extends into a publicly owned rights-of-way.*

3. *The municipal provider or individual user shall not serve or use water, other than stored water, withdrawn from a well for the purpose of maintaining a water feature, including fountains, waterfalls, ponds, water courses, and other artificial water structures, installed after January 1, 2002 within any publicly owned rights-of-way of a highway, street, road, sidewalk, curb or shoulder which is used for travel in any ordinary mode, including pedestrian travel. The director may waive this requirement upon request from the municipal provider or individual user if a waiver of this requirement is in the public interest. This requirement does not apply to any portion of a residential lot that extends into a publicly owned rights-of-way.*

B. Responsibility for Compliance with Individual User Requirements

1. *A municipal provider shall be responsible for complying with an individual user requirement set forth in subsection A of this section for an existing individual user unless one of the following applies:*

   a. *The provider identified the existing individual user to the director on a form provided by the Department and received by the director no later than 90 days before the adoption of the Third Management Plan.*

   b. *The director gave written notice of the individual user requirement to the individual user within 30 days after the adoption of the Third Management Plan.*

2. *An existing individual user that has been given written notice of an individual user requirement by the director shall be responsible for complying with the individual user requirement beginning on the date specified in the notice.*

3. *A municipal provider shall be responsible for complying with an individual user requirement set forth in subsection A of this section for a new individual user unless one of the following applies:*

   a. *The municipal provider identifies the new individual user to the director on a form provided by the Department. If the provider identifies the new individual user to the director within 90 days after the provider begins serving water to the new individual user, the municipal provider shall not be responsible for complying with the individual user requirement at any time. If the provider identifies the new individual user to the director more than 90 days after the provider begins serving water to the new individual user, the provider shall be responsible for complying with the individual user requirement beginning on the date the new individual first receives*

water from the provider until the end of the calendar year in which the provider identifies the individual user to the director.

b. The director has given written notice of the individual user requirement to the individual user and the individual user is responsible for complying with the requirement.

4. A new individual user that has been given written notice of an individual user requirement by the director shall be responsible for complying with the individual user requirement beginning on the date specified in the notice.

C. Notification of New Individual User by Municipal Provider

Beginning January 1, 2002 and continuing thereafter until the first compliance date for any substitute requirement in the Fourth Management Plan, a municipal provider shall notify a new individual user in writing of its individual user requirements as set forth in subsection A of this section before commencement of service of water to the individual user.

5-112. Conservation Requirements for Municipal Distribution Systems

For the calendar year 2002 or the calendar year in which the provider commences service of water, whichever is later, and for each calendar year thereafter until the first compliance date for any substitute requirement in the Fourth Management Plan:

1. A large municipal provider shall not operate a municipal distribution system in a manner such that lost and unaccounted for water exceeds 10 percent of the total quantity of water from any source, except direct use effluent, withdrawn, diverted, or received by the large municipal provider on an annual or three-year average basis.

2. A small municipal provider shall not operate its municipal distribution system in a manner such that lost and unaccounted for water exceeds 15 percent of the total quantity of water from any source, except direct use effluent, withdrawn, diverted, or received by the small municipal provider on an annual or three-year average basis.

5-113. Monitoring and Reporting Requirements for Municipal Providers and Individual Users

For the calendar year 2002 or for the calendar year in which the municipal provider commences service of water, whichever is later, and for each calendar year thereafter until the first compliance date for any substitute requirement in the Fourth Management Plan:

1. A large municipal provider shall separately measure and report in its annual reports required by A.R.S. §§ 45-468 and 45-632 the total quantity of water from any source, including effluent, delivered each month for: (a) irrigation uses; (b) residential uses by category, including single family and multifamily; (c) non-residential uses by category, including commercial uses, industrial uses, government uses, construction uses, and other uses; and (d) turf-related facility use.

2. A municipal provider shall report the following in its annual report required by A.R.S. § 45-632:

a. The total quantity of water from any source, disaggregated by each source, withdrawn, diverted, or received by the provider for non-irrigation use during the

reporting year, as separately measured with a measuring device in accordance with paragraph 6 of this subsection.

b. *The total quantity of water from any source, including effluent, withdrawn, diverted, or received by the provider for irrigation use during the reporting year.*

c. *The total quantity of effluent, disaggregated by direct use effluent, effluent recovered within the area of impact, and effluent recovered outside the area of impact, served by the provider during the reporting year for non-irrigation use.*

d. *The number of single family housing units added to the provider's service area from July 1 of the previous calendar year to July 1 of the reporting year.*

e. *The number of multifamily housing units added to the provider's service area from July 1 of the previous calendar year to July 1 of the reporting year.*

f. *The total number of single family housing units and multifamily housing units served by the provider as of July 1, 2000.*

g. *The number of single family housing units and the number of multifamily housing units added to the provider's service area between July 1, 2000 and July 1 of the reporting year.*

h. *The provider's total quantity of lost and unaccounted for water during the calendar year.*

i. *The percentage of the total quantity of water from any source, except effluent, withdrawn, diverted, or received by the provider during the calendar year that is lost and unaccounted for water.*

3. *In addition to the information required by paragraphs 1 and 2 of this section, a large municipal provider regulated under the NPCCP described in section 5-104 shall include the following in its annual report required by A.R.S. § 45-632:*

a. *The information listed in the monitoring and reporting requirement sections of those RCMs set forth in Appendix 5H.- 2 and 4 that the provider agrees in writing to implement pursuant to section 5-104, subsection E, paragraph 1.*

b. *If the provider applied for the NPCCP under section 5-104, subsection A, paragraph 4, the information required to be submitted by the provider under the AWS Rules adopted by the director pursuant to A.R.S. § 45-576.*

c. *Any other information required by the director in order to determine the provider's compliance with the NPCCP.*

4. *In addition to the information required by paragraphs 1 and 2 of this section, a large municipal provider regulated under the ACP described in section 5-105 shall include in its annual report required by A.R.S. § 45-632:*

a. *A status report describing progress in implementing the provider's programs proposed in its application, specifically including the provider's proposed conservation plan.*

b. The information listed in the monitoring and reporting requirement sections of those RCMs set forth in Appendix 5H.1-4 that the provider agrees in writing to implement pursuant to section 5-105, subsection C, paragraph 3.

5. A large municipal provider shall meter water deliveries to all service connections on its municipal distribution system, except connections to fire services, dwelling units in individual multifamily units, mobile homes in a mobile home park with a master meter, and construction users.

6. A municipal provider shall make all water use measurements using measuring devices in accordance with the Department's measuring device rules, R12-15-901, et seq., Arizona Administrative Code.

7. An individual user shall comply with the monitoring and reporting requirements prescribed in the Industrial Chapter, if applicable, as though the individual user were an industrial user.

5-114. Remediated Groundwater Accounting for Conservation Requirements

A. Accounting

Groundwater withdrawn pursuant to an approved remedial action project under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) or Title 49, Arizona Revised Statutes, and used by a person subject to a conservation requirement established under this chapter, shall be accounted for consistent with the accounting for surface water for purposes of determining the person's compliance with the conservation requirement, subject to the provisions of subsections B through D of this section.

B. Amount of Groundwater Eligible for Accounting

For each approved remedial action project, the annual amount of groundwater that is eligible for the remediated groundwater accounting provided in subsection A of this section is the project's annual authorized volume. The annual authorized volume for a remedial action project approved on or after June 15, 1999 is the maximum annual volume of groundwater that may be withdrawn pursuant to the project, as specified in a consent decree or other document approved by the United States Environmental Protection Agency (EPA) or the Arizona Department of Environmental Quality (ADEQ). The annual authorized volume for a project approved prior to June 15, 1999 is the highest annual use of groundwater withdrawn pursuant to the project prior to January 1, 1999, except that if a consent decree or other document approved by the EPA or ADEQ specifies the maximum annual volume of groundwater that may be withdrawn pursuant to the project, the project's annual authorized volume is the maximum annual volume of groundwater specified in that document. The director may modify the annual authorized volume for a remedial action project as follows:

1. For an approved remedial action project associated with a treatment plant that was in operation prior to June 15, 1999, a person may request an increase in the annual authorized volume at the same time the notice is submitted pursuant to subsection C of this section. The director shall increase the annual authorized volume up to the maximum treatment capacity of the treatment plant if adequate documentation is submitted to the director demonstrating that an increase is necessary to further the purpose of the remedial action project and the increase is not in violation of the consent decree or other document approved by the EPA or ADEQ.

2. *A person may request an increase in the annual authorized volume of an approved remedial action project at any time if it is necessary to withdraw groundwater in excess of the annual authorized volume to further the purpose of the project. The director shall increase the annual authorized volume up to the maximum volume needed to further the purpose of the project if adequate documentation justifying the increase is submitted to the director and the increase is not in violation of the consent decree or other document approved by the EPA or ADEQ.*

3. *The director shall modify the annual authorized volume of an approved remedial action project to conform to any change in the consent decree or other document approved by the EPA or ADEQ if the person desiring the modification gives the director written notice of the change within thirty days after the change. The notice shall include a copy of the legally binding agreement changing the consent decree or other document approved by the EPA or ADEQ.*

C. Notification

To qualify for the remediated groundwater accounting provided in subsection A of this section, the person desiring the accounting must notify the director in writing of the anticipated withdrawal of groundwater pursuant to an approved remedial action project under CERCLA or Title 49, Arizona Revised Statutes, prior to the withdrawal. A municipal provider may submit notice on behalf of an individual user. At the time the notice is given, the person desiring the accounting must be using remediated groundwater pursuant to the approved remedial action project or must have agreed to do so through a consent decree or other document approved by the EPA or ADEQ. The notice required by this subsection shall include all of the following:

1. *A copy of a document approved by ADEQ or the EPA, such as the Remedial Action Plan (RAP), Record of Decision (ROD) or consent decree, authorizing the remediated groundwater project. Unless expressly specified in the document, the person shall include in the notice the volume of groundwater that will be pumped annually pursuant to the project, the time period to which the document applies, and the annual authorized volume of groundwater that may be withdrawn pursuant to the project.*

2. *The purpose for which the remediated groundwater will be used.*

3. *The name and telephone number of a contact person.*

4. *Any other information required by the director.*

D. Monitoring and Reporting Requirements

To qualify for the remediated groundwater accounting for conservation requirements as provided in subsection A of this section, groundwater withdrawn pursuant to the approved remedial action project must be metered separately from groundwater withdrawn in association with another groundwater withdrawal authority for the same or other end use. A person desiring the remediated groundwater accounting for conservation requirements shall indicate in its annual report under A.R.S. § 45-632 the volume of water withdrawn and used during the previous calendar year that qualifies for the accounting.

REFERENCES

Craft, M., 1997. *Draft Summary of Landscape Survey Results*, for ADWR, unpublished.

Karpiscak, et al., 1998. *Evaporative Cooler Water Use in Phoenix*, Journal, American Water Works Association Vol.90, Issue 4 (April 1998).

Pima County Cooperative Extension Service, Low4 Program, 1996. *How to Develop a Drip Irrigation Schedule* and *Plant Water Requirements, Tucson, Arizona*. Landscape Water Conservation Workshop materials.

APPENDIX 5A
MUNICIPAL WATER PROVIDERS
SANTA CRUZ ACTIVE MANAGEMENT AREA

Provider	Right Number	Large Provider	Small Provider	Organization
Baca Float Land Development LP	56-000020		X	Miscellaneous
Buena Vista Ranch	56-000030		X	Miscellaneous
Citizens' Water Resources - Tubac	56-000042	X		Private Water Company
Lakewood Water Company	56-000127		X	Private Water Company
Mi Casa MHP	56-000165		X	Mobile Home Park
Mountain View Campground	56-000047		X	Miscellaneous
City of Nogales	56-000002	X		Municipality
Olivas, Filiberto	56-000336		X	Miscellaneous
Rio Rico Utilities, Inc.	56-000041	X		Private Water Company
Sedgwick, Cabot	56-000364		X	Miscellaneous
Spencer Water Company	56-000363		X	Private Water Company
Town and Country Terrace MHP	56-000219		X	Mobile Home Park
Valle Verde Water Company	56-000228	X		Private Water Company
Wingfield Cattle Company	56-000326		X	Miscellaneous

APPENDIX 5B
LOW WATER USE/DROUGHT TOLERANT PLANT LIST
SANTA CRUZ ACTIVE MANAGEMENT AREA

The Low Water Use/Drought Tolerant Plant List for the Santa Cruz AMA is filed in the Department's Santa Cruz AMA Office. A copy of the list, effective as of March 1998, follows in this Appendix. Since the list may be amended using the procedure described below, a current list is available upon request from the Santa Cruz AMA office or the Department's public information office in Phoenix.

PROCEDURE FOR MODIFICATION OF LOW WATER USE PLANT LIST FOR THE SANTA CRUZ ACTIVE MANAGEMENT AREA

A. A person who seeks to add a plant or plants to the Low Water Use Plant List for the Santa Cruz AMA or delete a plant or plants from the list may apply at any time to the director for a modification of the list. The application shall be made on a form prescribed and furnished by the director.

B. The director shall review each request for a modification of the list. The director may request additional information from the applicant and may seek information from other sources as may be necessary to determine whether the list should be modified.

C. If the director approves the addition of a plant to the list, the director shall place the plant on a supplemental list that shall be considered an addendum to the list. The supplemental list shall be available from the Santa Cruz AMA Office or from the public information office upon request. If the director approves the deletion of a plant from the list, the deleted plant or plants shall be listed as deleted on the supplemental list.

D. The director shall conduct an annual review of the list and issue a modified plant list no later than March 1 of the following year. As a result of the review, the director may add plants to the list, delete plants from the list, or both.

APPENDIX 5B *(continued)*
LOW WATER USE/DROUGHT TOLERANT PLANT LIST
SANTA CRUZ ACTIVE MANAGEMENT AREA

OFFICIAL REGULATORY LIST FOR:

Arizona Department of Water Resources,
Santa Cruz Active Management Area

The plants on this list can be grown with moderate to no supplemental irrigation once they are established. Occasionally, for good appearance, supplemental irrigation may be applied during the growing season. In addition to the cacti on this list, any cacti salvaged and tagged in compliance with state agricultural and horticultural regulations may be used.

Even though all of the plants on the Low Water Use/Drought Tolerant Plant List meet the Department's standard for low water consumption, please check the regulations of the governing jurisdiction to determine whether a particular plant selection meets all locational, aesthetic, or functional requirements. For example, plants used for screening may have to be evergreen, have dense foliage, and grow to required heights. On the other hand, plants used within sight visibility triangles may have height restrictions. In some applications, there may be a requirement for native materials or a "desert or natural appearance."

Some plants on the list may fall under more than one plant type category and this is noted (i.e., Acacia constricta can be grown as a tree or a shrub depending upon the growth habit that is preferred). Cultivars of plants listed may also be planted in regulated areas.

Applications for additions, deletions, or exceptions to the list may be submitted to the Department of Water Resources, Santa Cruz Active Management Area Office, for consideration. Phone: (520) 761-1814; Fax: (520) 761-1869.

APPENDIX 5B *(continued)*
LOW WATER USE/DROUGHT TOLERANT PLANT LIST
SANTA CRUZ ACTIVE MANAGEMENT AREA

Key to symbols

(sh)	Semi-hardy -- some dieback in a hard frost
(t)	Tender -- severely damaged or killed in a hard frost
*	Toxic; may be harmful if eaten For more information, call Arizona Poison Control Center at 626-6016
#	Exceptions to the nomenclature in Hortus III
A	Accent Plant
an	Annual
C	Cactus
cl	Seasonal Color (showy flowers, fall color or berries)
Gc	Groundcover
Gr	Ornamental Grass
I	Invasive -- may spread and intrude into natural areas
p	Perennial
S	Shrub
Sc	Succulent (other than cacti)
T	Tree
V	Vine
CD	Chihuahuan Desert Region - broadly interpreted to include a large area of north central and northwest Mexico, southwest Texas, southern New Mexico, and extreme southeast Arizona
SD	Sonoran Desert Region - broadly interpreted to include the arid and semi-arid areas of northwest Mexico, southeast California, and most of Arizona south of the Mogollon Rim

Note: Chihuahuan and Sonoran Desert Regions annotated by Matt Johnson, Native Plant Society.

Approximate Watering Needs (depending on soil and climate conditions)

1	No supplemental irrigation once established.
2	Once a month during the growing season once established.
3	Twice a month during the growing season once established.
4	Once a week during the growing season once established.

APPENDIX 5B *(continued)*
LOW WATER USE/DROUGHT TOLERANT PLANT LIST
SANTA CRUZ ACTIVE MANAGEMENT AREA

Plant Type Category	Region	Low Water Use/ Drought Tolerant Plant List	Watering Needs		
Gc,an	SD	Abronia villosa	1		Sand verbena
T	Africa	Acacia abyssinica	3	(sh)	Abyssinian Acacia
T	Austr.	Acacia aneura	2	(sh)	Mulga
S	SD	Acacia angustissima	2	(sh)	White Ball Acacia
S,T	CD	Acacia berlandieri	3		Guajillo
T,S*	SD,CD	Acacia constricta	1		Whitethorn Acacia, Mescat
T,S	Austr.	Acacia crasspedocarpa	1		Waxleaf Acacia
T,S	Austr.	Acacia cultriformis	2	(sh)	Knife-Leaf Acacia
T,S	SD,CD	Acacia greggii	1		Cat's Claw Acacia
T,S,cl	SD,CD	Acacia minuta (smallii)	2		Southwestern Sweet Acacia
S	Austr.	Acacia notabilis	2		Acacia
S,Gc	Austr.	Acacia redolens	2		Prostrate Acacia
S,T	CD	Acacia rigidula	3		Black Brush Acacia
T,cl	Austr.	Acacia salicina	2	(sh)	Weeping Wattle
T	Austr.	Acacia saligna	1-2	(sh)	Wattle Tree
T	CD	Acacia schaffneri	1-2		Twisted Acacia
T	Austr.	Acacia stenophylla	1-2		Pencilleaf Acacia
T	SD	Acacia willardiana	1-2	(sh)	Palo Blanco
Sc	CD	Agave americana	1-2		Century Plant
Sc	SD	Agave colorata	1		Agave
Sc	CD	Agave filifera	1-2		Agave
Sc	Mex.	Agave geminiflora	2	(sh)	Twin-flowered agave
Sc	SD	Agave huachucensis	1-2		Huachuca Agave
Sc	CD	Agave lophantha (univittata)	2		Agave
Sc	SD	Agave ocahui	1-2		Ocahui Agave
Sc	SD	Agave palmeri	1		Palmer Agave
Sc	Mex.	Agave parryi v. truncata	2		Artichoke Agave
Sc	CD	Agave victoriae-reginae	1-2		Victoria Regina Agave
Sc	SD	Agave vilmoriniana	1-2	(sh)	Octopus Agave
Sc,cl	Africa	Aloe barbadensis	2-3	(sh)	Barbados Aloe
Sc,cl	Africa	Aloe ferox	2-3	(sh)	Cape Aloe
Sc,cl	Africa	Aloe saponaria	2-3	(sh)	Mediterranean Aloe
Sc, cl	Africa	Aloe variegata	2-3		Partridge Breast Aloe
S	SD,CD	Aloysia gratissimma	2		Fragrant Bush, Bee Brush
S	SD,CD	Aloysia wrightii	2		Wright's Oregano, Lemon Verbena
S	SD	Ambrosia (Franseria) deltoidea	1		Triangle-leaf Bursage
S	SD	Ambrosia (Franseria) dumosa	1		White Bursage
S	SD	Anisacanthus thurberi	2		Desert Honeysuckle
V,cl	SD	Antigonon leptopus	2-3	(t)	Queen's Wreath
Gr,cl	SD,CD	Aristida purpurea	1		Purple three-awn
S	SD,CD	Asclepias linaria	2		Pine-Leaf Milkweed

APPENDIX 5B *(continued)*
LOW WATER USE/DROUGHT TOLERANT PLANT LIST
SANTA CRUZ ACTIVE MANAGEMENT AREA

Plant Type Category	Region	Low Water Use/ Drought Tolerant Plant List	Watering Needs		
A	SD	Asclepias subulata	2	(sh)	Desert Milkweed
an	SD	Aster bigelovii	1	(t)	Aster
an	SD,CD	Aster tanacetifolius	1	(t)	Aster
S	SD,CD	Atriplex canescens	1		Four-Wing Saltbush
S	SD	Atriplex lentiformis	1		Quail Bush
S	SD	Atriplex lentiformis breweri	1-2		Brewer Saltbush
S	Austr.	Atriplex nummularia	1		Old Man Saltbush
S	SD	Atriplex polycarpa	1		Desert Saltbush
S	Austr.	Atriplex semibaccata	2		Australian Saltbush
S,I	SD	Baccharis sarothroides (male only)	1-2		Desert Broom
S,Gc	SD	Baccharis sarothroides 'Centennial'	2-3		Centennial
p,cl	SD	Bahia absinthifolia	2		Desert Daisy
p,cl*	SD,CD	Baileya multiradiata	1-2		Desert Marigold
S	SD	Berberis harrisoniana	3		Barberry
S	SD	Berberis trifoliata	3		Agritos
Gr,cl	SD,CD	Bothriochloa barbinodis	1		Cane beardgrass
V,S,cl	Brazil	Bougainvillea spp.	3	(t)	Bougainvillea
Gr	SD,CD	Bouteloua chondrosioides	2		Sprucetop grama
Gr,cl	SD,CD	Bouteloua curtipendula	2		Sideoats grama
Gr,cl	SD	Bouteloua eriopoda	3		Black Grama
Gr	SD,CD	Bouteloua gracilis	2		Blue grama
Gr	SD	Bouteloua hirsuta	2		Hairy grama
Gr	SD,CD	Bouteloua rothrockii	1		Rothrock grama
T	Austr.	Brachychiton populneus	2-3		Bottle Tree
T	SD	Brahea (Erythea) armata	2-3		Mexican Blue Palm
Gr	CD	Buchloe dactyloides	2-3		Buffalo grass
S,cl	CD	Buddleia marrubifolia	2-3		Wooly Butterfly Bush
Sc,cl	S. Afr.	Bulbine frutescsns	2	(sh)	Shrubby bulbine
S,cl*	CD	Caesalpinia (Poinciana) mexicana	2		Mexican Bird of Paradise (Yellow)
S,cl*	Argent.	Caesalpinia (Poinciana) gilliesii	1-2		Yellow Bird of Paradise
S,cl*	Carib.	Caesalpinia pulcherrima	3	(sh)	Red Bird of Paradise
S,cl	SD	Calliandra californica	2-3		Red Fairy Duster, Baja Fairy Duster
S,cl	SD	Calliandra eriophylla	1		Fairy Duster, False Mesquite
S,cl	SD	Calliandra peninsularis	2-3	(sh)	Red Calliandra, Baja Fairy Duster
T,S,cl	Austr.	Callistemon citrinus	3	(sh)	Lemon Bottlebrush
Gc,cl	CD	Calylophus hartwegii	3		Calylophus
V,cl	SD,CD	Campsis radicans	2-3		Common Trumpet Creeper
C	SD	Carnegiea gigantea	1		Saguaro

APPENDIX 5B *(continued)*
LOW WATER USE/DROUGHT TOLERANT PLANT LIST
SANTA CRUZ ACTIVE MANAGEMENT AREA

Plant Type Category	Region	Low Water Use/ Drought Tolerant Plant List	Watering Needs		
Gc,Sc,cl	Africa	Carpobrotus edulis	3	(t)	Ice Plant
S,cl	Austr.	Cassia artemisioides	2-3	(sh)	Wormwood Senna, Feathery Cassia
S,cl	Austr.	Cassia nemophila (eremophila)	2		Green Cassia
S,cl	Austr.	Cassia phyllodinea	2-3		Silvery Cassia
T	Austr.	Casuarina cunninghamiana	3		Australian Pine
T	Austr.	Casuarina stricta	2-3		Coast Beefwood
T,cl		Catalpa x chilopsis	4		Chitalpa
Gr,cl	SD	Cathostecum erectum	1		False grama
S	SD,CD	Celtis pallida	1-2		Spiny or Desert Hackberry
T	SD,CD	Celtis reticulata	2		Netleaf or Western Hackberry
p,cl	Medit.	Centaurea cineraria	3		Dusty Miller
Gc,Sc,cl		Cephalophyllum `Red Spike'	2		Red Spike Ice Plant
T	Medit.	Ceratonia siliqua	3	(sh)	Carob, St. John's Bread Tree
T,cl	SD	Cercidium floridum	2-3		Blue Palo Verde
T,cl	SD,CD	Cercidium hybrid 'Desert Museum'	1		Desert Museum Palo Verde
T,cl	SD	Cercidium microphyllum	1		Littleleaf or Foothill Palo Verde
T,cl	SD	Cercidium praecox	2	(sh)	Palo Brea
T,cl	SD	Cercidium sonorae	1-2		Sonoran Palo Verde
T,S	CD	Cercis canadensis var. mexicana	3		Mexican Redbud
C	S. Am.	Cereus peruvianus	1-2	(sh)	Peruvian Cereus
T	Spain	Chamaerops humilis	2-3		Mediterranean Fan Palm
T,S,cl	SD,CD	Chilopsis linearis	2-3		Desert Willow
S,cl		Chrysactinia mexicana	3		Damianita
V,I	CD	Cissus incisa	1-2		Desert Grape Ivy
V	SD	Cissus trifoliata	1-2		Desert Grape Ivy
S	SD,CD	Condalia warnockii var. kearneyana	1		Condalia
S,Gc,cl*	Medit.	Convolvulus cneorum	1-2		Bush Morning Glory
Gc,cl	Africa	Convolvulus mauritanicus	3	(sh)	Ground Morning Glory
T,S,cl	CD	Cordia boissieri	2-3	(sh)	Anacahuita, Texas Olive
S,cl	SD,CD	Cordia parvifolia	1-2		Littleleaf Cordia
Gr	Arg.	Cortaderia selloana	3		Pampas Grass
T	SD,CD	Cupressus arizonica	2		Arizona Cypress
T	SD	Cupressus glabra	2-3		Smooth Bark Cypress
T	India	Dalbergia sissoo	3	(sh)	Rosewood
S	SD	Dalea bicolor var. argyrea	2-3		Silver Dalea
Gc,cl	Mexico	Dalea capitata	3		Yellow Dalea

APPENDIX 5B *(continued)*
LOW WATER USE/DROUGHT TOLERANT PLANT LIST
SANTA CRUZ ACTIVE MANAGEMENT AREA

Plant Type Category	Region	Low Water Use/ Drought Tolerant Plant List	Watering Needs		
S,cl	CD	Dalea frutescens	2-3		Black Dalea
Gc	CD	Dalea greggii	2-3		Trailing Indigo Bush
S,cl	SD	Dalea pulchra	2-3		Indigo Bush
S,cl	SD	Dalea versicolor var. sessilis	3		Indigo Bush, Dalea
A	CD	Dasylirion acrotriche	1		Green Desert Spoon
A	SD,CD	Dasylirion wheeleri	1		Sotol, Desert Spoon
Gc,p,cl*	SD	Datura wrightii	3	(sh)	Sacred Datura
Gr	SD,CD	Digitaria californica	1		Arizona cottontop
an,cl	S. Afr.	Dimorphotheca sinuata	4		African Daisy, Cape Marigold
S	SD,CD	Dodonaea viscosa	1-2	(sh)	Hopbush
Gc,p,cl	SD,CD	Dyssodia acerosa	2-3		Dogweed
Gc,an,p,cl	SD,CD	Dyssodia pentachaeta	2-3		Dyssodia
C,cl	SD	Echinocactus grusonii	1-2		Golden Barrel
C,cl	CD,SD	Echinocereus spp.	1		Hedgehog, Rainbow Cactus
C,cl	S. Am.	Echinopsis spp.	1		Easter Lily, Sea Urchin Cactus
S,cl	SD	Encelia californica	1-2	(sh)	California Brittlebush (green)
S,cl	SD	Encelia farinosa	1-2	(sh)	Brittlebush
S	SD	Ephedra nevadensis	3		Ephedra
Gr	SD,CD	Eragrostis intermedia	1		Plains lovegrass
S,cl	Austr.	Eremophila decipiens	1		Emu Bush
Gr	SD,CD	Erioneuron pulchellus	1		Fluffgrass
an,cl	SD	Eschscholtzia californica	2-3		California Poppy
an,cl	SD	Eschscholtzia mexicana	3		Mexican Gold Poppy
T	Austr.	Eucalyptus camaldulensis	2		Red River Gum
T	Austr.	Eucalyptus campaspe	2-3	(sh)	Silver Gimlet
T	Austr.	Eucalyptus formanii	2		Eucalyptus
T,cl	Austr.	Eucalyptus leucoxylon (rosea)	2		White Iron Bark
T	Austr.	Eucalyptus microtheca	1-2		Tiny Capsule Eucalyptus
T	Austr.	Eucalyptus polyanthemos	2		Silver Dollar Gum
T	Austr.	Eucalyptus rudis	2		Desert Gum
T	Austr.	Eucalyptus spathulata	3		Swamp Mallee
S	CD	Euphorbia antisyphilitica	1		Wax Plant, Candelilla
Gc		Euphorbia myrsinites	2		Euphorbia
A,Sc,cl*	Africa	Euphorbia rigida (biglandulosa)	2		Gopher Plant
T,S,cl	S. Am.	Feijoa sellowiana	3		Pineapple Guava
C,cl	SD,CD	Ferocactus spp.	1		Barrel Cactus
A,cl	SD,CD	Fouquieria splendens	1		Ocotillo
an,cl	CD	Gaillardia pulchella	3		Fire Wheel, Blanket Flower

APPENDIX 5B *(continued)*
LOW WATER USE/DROUGHT TOLERANT PLANT LIST
SANTA CRUZ ACTIVE MANAGEMENT AREA

Plant Type Category	Region	Low Water Use/ Drought Tolerant Plant List	Watering Needs		
Gc,cl	Africa	Gazania rigens	3-4		Treasure Flower Gazania
Gc,cl	Africa	Gazania rigens leucolaena	3-4	(t)	Trailing Gazania
T,cl	S. Am.	Geoffreya (Gourleia) decorticans	1		Chilean Palo Verde
S,cl	SD	Gossypium harknessii	2	(t)	Gossypium
S,cl	SD,CD	Haplopappus (Ericameria) laricifolius	1		Turpentine Bush
A	CD	Hesperaloe funifera	1-2		Giant Hesperaloe
A,cl	CD	Hesperaloe parviflora	1-2		Red Yucca, Red-Flowered Hesperaloe
Gr	SD	Hetropogon contortus	3		Tanglehead
S	SD,CD	Hibiscus coulteri	2		Yellow Hibiscus, Coulter's Hibiscus
Gr	SD,CD	Hilaria berlangeri	2		Curly mesquite
Gr	SD,CD	Hilaria mutica	1		Tobosa grass
Gr	SD,CD	Hilaria rigida	2		Big galleta grass
p,cl	SW US	Hymenoxys acaulis	3		Angelita Daisy
S	SD	Hyptis emoryi	3	(sh)	Desert Lavendar
S	SD	Jatropha cardiophylla	1		Limberbush
S,cl	CD	Jatropha dioica	1	(t)	Jatropha
T,S	Asia	Juniperus chinensis	3		Juniper (many culitvars)
T	SD,CD	Juniperus deppeana	3		Alligator Bark Juniper
S		Juniperus sabina	3		Sabine Juniper
S,cl	SD	Justicia (Beloperone) californica	2-3	(t)	Chuparosa
S,cl	SD	Justicia candicans	3	(sh)	Red Jacobinia
S,cl	SD	Justicia spicigera	3	(sh)	Mexican Honeysuckle, Firecracker Bush
S,cl*	S. Am.	Lantana camara	3-4	(t)	Bush Lantana (many cultivars)
Gc,cl*	S. Am.	Lantana montevidensis	3-4	(t)	Trailing Lantana
S,cl	SD,CD	Larrea tridentata (divaricata)	1		Creosote Bush, Greasewood
Gr	CD	Leptochloa dubia	3		Green Sprangle-Top
T,S,cl	CD	Leucaena retusa	1-2		Golden Leadball
S,cl	CD	Leucophyllum spp.	2		Texas Ranger (all cultivars)
Gc,an,cl	Eurasia	Linum grandiflorum `Rubrum'	3		Scarlet Flax
an,cl	SD,CD	Linum lewisii	3		Blue Flax
an,cl	SD	Lupinus arizonicus	1		Lupine
an,cl	SD	Lupinus sparsiflorus	1		Desert Lupine
an,cl	SD	Lupinus succulentus	1		Arroyo Lupine
S	SD	Lycium exsertum	1		Lycium
S	SD	Lycium fremontii	1		Wolfberry
T,S	SD	Lysiloma thornberi	2-3	(sh)	Feather Tree

APPENDIX 5B *(continued)*
LOW WATER USE/DROUGHT TOLERANT PLANT LIST
SANTA CRUZ ACTIVE MANAGEMENT AREA

Plant Type Category	Region	Low Water Use/ Drought Tolerant Plant List	Watering Needs		
V,cl	Amer.	Macfadyena unguis-cati	2-3		Cat's Claw Vine
Gc,Sc,cl		Malephora crocea	2-3		Croceum, Ice Plant
C,cl	SD,CD	Mamillaria spp.	1-2		Mamillaria Cactus
V,cl	CD	Mascagnia lilacina	2-3		Lavender Orchid Vine
V,cl	SD,CD	Mascagnia macroptera	2-3	(sh)	Yellow Orchid Vine
S	SD,CD	Maytenus phyllanthoides	2		Mangle Dulce
Gc,p,cl	SD,CD	Melampodium leucanthum	2		Blackfoot Daisy
V,cl	SD	Merremia aurea	2-3	(t)	Yellow Merremia
S,cl	SD	Mimosa dysocarpa	2		Velvetpod
Gr	SD	Muhlenbergia dumosa	3-4		Bush Muhlenbergia, Bamboo Muhly
Gr,cl	SD	Muhlenbergia emersleyi	1		Bullgrass
Gr,cl	SD,CD	Muhlenbergia porteri	1		Bush muhly
Gr	SD	Muhlenbergia rigens	3		Deer grass
Gr,cl	SD	Muhlenbergia rigida	3		Muhlenbergia
Gc	Austr.	Myoporum parvifolium	3		Myoporum
S	Medit.	Myrtus communis	3		True Myrtle, Roman Myrtle
S,cl		Nandina domestica	3		Heavenly Bamboo (many cultivars)
S,cl*	Medit.	Nerium oleander	2-3		Oleander (many cultivars)
A	SD	Nolina bigelovii	1-2		Beargrass
A,T	SD	Nolina matapensis	1-2		Tree Beargrass
A	SD	Nolina microcarpa	1-2		Beargrass
A	SD	Nolina parryi	1-2		Parry's Beargrass
Gc,cl	CD	Oenothera berlandieri (speciosa)	3		Mexican Evening Primrose
p,cl	SD	Oenothera caespitosa	2-3		Tufted Evening Primrose
Gc,cl	CD	Oenothera stubbei	2-3		Chihuahuan Primrose, Baja Primrose
T	Medit.	Olea europaea `Swan Hill'	3		Swan Hill Olive
T	SD,CD	Olneya tesota	1	(sh)	Desert Ironwood, Tesota
C	SD,CD	Opuntia spp.	1		Prickly Pear, Cholla
Gr	SD,CD	Oryzopsis hymenoides	3		Indian ricegrass
Gc,cl	Africa	Osteospermum fruticosum	3-4	(sh)	Trailing African Daisy
Gr	SD	Pappophorum mucronulatum	1		Pappusgrass
T,I,cl	SD,CD	Parkinsonia aculeata	1-2		Mexican Palo Verde
V	SD	Passiflora foetida	3	(sh)	Passion Flower
A,Sc,cl*	SD	Pedilanthus macrocarpus	2		Slipper Flower
Gr	Africa	Pennisetum setaceum `Cupreum'	1-2		Purple fountain grass
p,cl	W US	Penstemon ambiguus	2		Pink Plains Penstemon
p,cl	CD	Penstemon baccharifolius	1		Cutleaf Penstemon

APPENDIX 5B *(continued)*
LOW WATER USE/DROUGHT TOLERANT PLANT LIST
SANTA CRUZ ACTIVE MANAGEMENT AREA

Plant Type Category	Region	Low Water Use/ Drought Tolerant Plant List	Watering Needs		
p,cl	SD,CD	Penstemon barbatus	1		Beardtongue Penstemon
p,cl	SD	Penstemon eatoni	1		Eaton's Penstemon
p,cl	SW US	Penstemon palmeri	2		Palmer Penstemon
p,cl	SD	Penstemon parryi	1		Parry Penstemon
p,cl	SD	Penstemon pseudospectabilis	1		Canyon Penstemon, Mohave Beardtongue
p,cl	CD	Penstemon superbus	1		Superb Penstemon
Gc	Africa	Pentzia incana	1-2		Karoo Bush
an,cl	SD	Phacelia campanularia	2-3		Desert Canterbury Bells
an,cl	SD	Phacelia tanacetifolia	2-3		Tansy Phacelia
T		Phoenix canariensis	3		Canary Island Date Palm
T	Asia	Phoenix dactylifera	3		Date Palm
Gc,cl		Phyla nodiflora	3-4		Lippia
T		Pinus edulis	2-3		Piñon Nut Pine
T#	Asia	Pinus eldarica	2		Afghan Pine
T	Medit.	Pinus halepensis	2		Aleppo Pine
T	Mojave	Pinus monophylla	2		Singleleaf Piñon Pine
T	Medit.	Pinus pinea	2-3		Italian Stone Pine
T	Asia	Pinus roxburghii	3		Chir Pine
T	Africa	Pistacia atlantica	2		Mt. Atlas Pistache
T,cl	Asia	Pistacia chinensis	3		Chinese Pistache
T,cl		Pistacia terebinthus x integerrima	3		Pistache hybrid terebinthus x integerrima
T	Asia	Pistacia vera	2-3		Pistachio
T	CD	Pithecellobium flexicaule	2	(sh)	Texas Ebony
T	SD	Pithecellobium mexicanum	3		Mexican Ebony
T	CD	Pithecellobium pallens	2	(sh)	Tenaza
T	Austr.	Pittosporum phillyraeoides	2		Willow Pittosporum
an	SD,CD	Plantago spp.	1-2		Indian Wheat
T#	S. Am.	Prosopis (So. Am. hybrid)	2		Thornless Mesquite (So. Am. hybrid)
T#	S. Am.	Prosopis alba	2		Argentine Mesquite
T#	S. Am.	Prosopis chilensis	2		Chilean Mesquite
T#	CD	Prosopis glandulosa glandulosa	2		Honey or Texas Mesquite
T	SD,CD	Prosopis pubescens	2		Screwbean Mesquite
T#	SD	Prosopis velutina	2		Velvet Mesquite
p,cl	SD,CD	Psilostrophe cooperi	2		Paper Flower
S,T,cl	India	Punica granatum	2-3		Pomegranate
S,cl		Pyracantha (red berried types)	3		Pyracantha (many cultivars)
T	SD,CD	Quercus arizonica	3		Arizona White Oak

APPENDIX 5B *(continued)*
LOW WATER USE/DROUGHT TOLERANT PLANT LIST
SANTA CRUZ ACTIVE MANAGEMENT AREA

Plant Type Category	Region	Low Water Use/ Drought Tolerant Plant List	Watering Needs		
T,cl	W.Tx.	Quercus buckleyi	2-3		Texas Red Oak
T	SD,CD	Quercus emoryi	3		Emory Oak
T		Quercus ilex	3		Holly Oak
T*	Medit.	Quercus suber	2		Cork Oak
S	W.U.S.	Quercus turbinella	2-3		Shrub Live Oak
T	SEU.S.	Quercus virginiana	3		Southern Live Oak
T,I	Africa	Rhus lancea	2		African Sumac
S,cl	CD	Rhus microphylla	2		Littleleaf Sumac
S	SD	Rhus ovata	2		Sugar Bush, Sugar Sumac
S,cl	CD	Rhus virens	2		Evergreen Sumac
S,Gc,V		Rosa banksiae	3		Lady Banks Rose,Tombstone Rose
S,cl	Medit.	Rosmarinus officinalis	2-3		Bush Rosemary
S,cl	SD	Ruellia californica	3	(t)	Ruellia
S,cl	SD	Ruellia peninsularis	3	(t)	Ruellia
Sc,Gc		Ruschia uncinatus	2		Ruschia
S,p,cl	CD	Salvia chamaedryoides	2-3		Blue Sage
S,cl		Salvia clevelandii	3		Cleveland Sage
an,cl	SD	Salvia columbariae	3		Chia
S,cl	CD	Salvia farinacea	3-4		Mealy Cup Sage
S,cl	CD	Salvia greggii	2-3		Texas Red Salvia,Autumn Sage
S,cl	SD	Salvia mohavensis	2		Mohave Sage
T	SD,CD	Sambucus mexicana	2		Mexican Elderberry
S,Gc	Medit.	Santolina chamaecyparissus	2-3		Lavender Cotton
Gc,S,cl	Medit.	Santolina virens	3-4		Green Santolina
T*	SD,CD	Sapindus saponaria	3-4		Soapberry
T	S.Am.	Schinus molle	2-3		California Pepper Tree
p,cl*		Senecio cineraria	3		Dusty Miller,Silver Plant
p,cl	SD	Senna covesii	1-2		Desert Senna
S	CD	Senna lindheimeriana	4	(sh)	Senna
S,p,cl	SD,CD	Senna wislizenii	2		Cassia,Shrubby Senna
Gc	Africa	Sesuvium verrucosum	2	(t)	Sea Purslane,Ice Plant
Gr	SD,CD	Setaria macrostachya	3		Plains Bristle Grass
S	SD	Simmondsia chinensis	1-2		Jojoba,Goat Nut
S,T,cl*	CD	Sophora secundiflora	2-3		Mescal Bean,Texas Mountain Laurel
p,cl	SD,CD	Sphaeralcea spp.	1		Globe-Mallow
Gr	SD,CD	Sporobolus airoides	3		Alkali Sacaton
Gr	SD,CD	Sporobolus contractus	1		Spike Dropseed
Gr	SD,CD	Sporobolus cryptandrus	3		Sand Dropseed
Gr	SD,CD	Sporobolus flexuosus	2		Mesa Dropseed
Gr	SD,CD	Sporobolus wrightii	1		Sacaton

APPENDIX 5B *(continued)*
LOW WATER USE/DROUGHT TOLERANT PLANT LIST
SANTA CRUZ ACTIVE MANAGEMENT AREA

Plant Type Category	Region	Low Water Use/ Drought Tolerant Plant List	Watering Needs		
C	SD	Stenocereus (Lemaireocereus) thurberi	1	(t)	Organ Pipe Cactus
Gr	SD,CD	Stipa neomexicana	2		New Mexicofeathergrass
p,cl	SD	Tagetes lemmoni	3-4		Mountain Marigold
T	Asia	Tamarix aphylla	1		Athel Tree,Tamarisk
S,cl	SD,CD	Tecoma stans var. angustata	2-3	(sh)	Trumpet-Bush
S,cl	Africa	Tecomaria capensis	4	(sh)	Cape Honeysuckle
Gc,p	Medit.	Teucrium chamaedrys (prostratum)	2-3		Prostrate Germander
S		Teucrium fruticans	3		Bush Germander
Gr	SD,CD	Trichloris crinita	2		Two-feather trichloris
C		Trichocereus spp.	1-2		Trichocereus Cactus
Gr	SD,CD	Tridens muticus	2		Slim tridens
T,cl	CD	Ungnadia speciosa	3		Mexican Buckeye
S,T#	SD	Vauquelinia californica	2		Arizona Rosewood
p,cl	SD	Verbena gooddingii	3-4		Goodding Verbena
p,cl	S.Am.	Verbena peruviana	4		Peruvian Verbena
p,cl	S.Am.	Verbena tenuisecta(pulchella)	3		Moss Verbena,Fineleaf Verbena
an,cl	SD,CD	Verbesina encelioides	2		Crown Beard
p,cl	SD	Viguiera deltoidea	2		Golden Eye
T,S,cl		Vitex agnus-castus	2		Chaste Tree,Monk's Pepper
T	SD	Washingtonia filifera	2		California Fan Palm
T	SD	Washingtonia robusta	2-3	(sh)	Mexican Fan Palm
T,S	China	Xylosma congestum	3-4		Xylosma
A	SD	Yucca aloifolia	1		Spanish Bayonet Yucca
A	SD,CD	Yucca baccata	1		Banana Yucca
A	CD	Yucca brevifolia	1		Joshua Tree
A	CD	Yucca carnerosana	1		Giant Dagger Yucca
A	SD,CD	Yucca elata	1		Soaptree Yucca
Sc	U.S.	Yucca glauca	1		Small Soapweed Yucca
A	U.S.	Yucca recurvifolia(pendula)	2		Pendulous or Curveleaf Yucca
A,cl	CD	Yucca rigida	1		Blue Dagger Yucca
A	CD	Yucca rostrata	1		Beaked Yucca
Sc	SD	Yucca schottii	1		Mountain Yucca
A	CD	Yucca treculeana	1		Tree Yucca
A	SD	Yucca whipplei	1		Our Lord's Candle
Gc,cl	SD	Zauschneria californica	3		Hummingbird Trumpet
S,cl	SWUS	Zexmenia hispida	2-3	(sh)	Rough Zexmenia
p,cl	SD,CD	Zinnia acerosa	1		Desert Zinnia
p,cl	CD	Zinnia grandiflora	2		Rocky Mountain Zinnia
T,I	Asia	Zizyphus jujuba	2		Chinese Date

APPENDIX 5C.1
TOTAL GPCD CONSERVATION PROGRAM
CONSERVATION REQUIREMENT CALCULATION
SANTA CRUZ ACTIVE MANAGEMENT AREA

A. Residential:

1. Existing Residential Allotment

   a. Determine the population in single family housing units as of July 1, 2000,
   Determine the population in multifamily housing units as of July 1, 2000,
   Add the SF and MF Population to determine Year 2000 Residential Population;

   b. Multiply the year 2000 residential population by the provider's existing residential GPCD component (Table 5-5), multiply this number by 365 days and divide the product by 325,851;

   c. The result is the annual volumetric allotment, in acre-feet, for existing residential uses. Reasonable reductions in GPCD are included in the annual target calculation.

2. New Single Family and Multifamily Residential Allotment:

   a. Determine the new single family housing units added since July 1, 2000,
   Determine the new single family population (post-7/1/00) for the calendar year,
   Determine the new multifamily housing units added since July 1, 2000,
   Determine the new multifamily population (post-7/1/00) for the calendar year;

   b. Multiply the new single family population by the interior rate for new single family residential development, 57 GPCD, then multiply the result by 365 days and divide the product by 325,851;

   c. Multiply the new single family housing units by the exterior rates for new single family residential development, 107 GPHUD, then multiply the result by 365 days and divide the product by 325,851;

   d. Multiply the new multifamily population by the rate for new multifamily residential development, 57 GPCD, then multiply the result by 365 days and divide the product by 325,851;

   e. Multiply the new multifamily housing units by the exterior rates for new single family residential development, 26 GPHUD, then multiply the result by 365 days and divide the product by 325,851;

   f. The sum of the results of paragraphs b, c and d is the annual volumetric allotment, in acre-feet, for new residential uses.

3. Add the existing residential allotment and the new residential allotment. The sum is the TOTAL RESIDENTIAL ALLOTMENT for the calendar year.

B. Non-Residential:

1. Multiply the total population for the calendar year by the provider's non-residential GPCD component from Table 5-5, multiply the result by 365 days and divide the product by 325,851;

2. The result is the volumetric allotment, in acre-feet, for non-residential uses for the calendar year.

C. Turf-Related Facilities:

The turf-related facilities component is the sum of the maximum annual water allotments, in acre-feet, for the turf-related facilities assigned to the provider in Appendix 5G. The allotment for a turf-related facility is included only if the facility is served water from any source by the provider during the calendar year.

D. Lost and Unaccounted For Water (LUW):

1. Subtract the total amount of water served during the calendar year for residential, non-residential, turf-related facilities, and system-related uses from the total amount of water withdrawn, received, diverted and recovered during the calendar year. The remainder is the LUW volume.

2. Divide the LUW volume by the total amount of water withdrawn, received, diverted and recovered for the calendar year.

3a. If the product is **less than or equal to** 10 percent, the volume of lost and unaccounted for water from D.1 is the volumetric allotment, in acre-feet, for the calendar year.

3b. If the product is **greater than** 10 percent, multiply the total amount of water withdrawn, received, diverted and recovered for the calendar year by 10 percent. The product is the volumetric allotment, in acre-feet, for lost and unaccounted for water for the calendar year.

APPENDIX 5C.2
TOTAL GPCD CONSERVATION PROGRAM
CONSERVATION REQUIREMENT CALCULATION EXAMPLE
SANTA CRUZ ACTIVE MANAGEMENT AREA

Example: The existing population is comprised of the occupants of housing units being served by the water provider as of July 1, 2000. The new population is comprised of occupants of housing units added to the provider's service area after July 1, 2000.

1)	EXISTING HOUSING UNITS/POPULATION		
	a. Existing (7/1/00) SF Housing Units	=	3,000
	b. Existing (7/1/00) MF Housing Units	=	800
	c. TOTAL EXISTING RESIDENTIAL HOUSING UNITS	**=**	**3,800**
	d. Existing (7/1/00) SF Population	=	9,000
	e. Existing (7/1/00) MF Population	=	2,800
	f. TOTAL EXISTING RESIDENTIAL POPULATION	**=**	**11,800**
2)	NEW HOUSING UNITS/POPULATION		
	a. New SF Housing Units Added after July 1, 2000	=	100
	b. New MF Housing Units Added after July 1, 2000	=	35
	c. TOTAL NEW RESIDENTIAL HOUSING UNITS	**=**	**140**
	d. New SF Population Added since July 1, 2000	=	300
	e. New MF Population Added since July 1, 2000	=	123
	f. TOTAL NEW RESIDENTIAL POPULATION	**=**	**423**
3)	COMPONENT RATES		
	a. Existing Residential GPCD Component	=	115 (1)
	b. New Residential SF Interior GPCD Component	=	57 (2)
	c. New Residential SF Exterior GPHUD Component	=	107 (2)
	d. New Residential MF Residential GPCD Component	=	57 (2)
	e. New Residential MF Exterior GPHUD Component	=	26
	e. Non-Residential GPCD Component	=	32 (3)
4)	COMPONENT ALLOTMENTS IN ACRE-FEET		
	a. Existing Residential = 11,800 people x 115 GPCD x 365 / 325851	=	1,520 AF/YR
	b. New SF Interior = 300 people x 57 GPCD x 365 / 325851	=	19 AF/YR
	c. New SF Exterior = 100 housing units x 107 GPHUD x 365 / 325851	=	12 AF/YR
	d. New MF Residential = 123 people x 57 GPCD x 365 / 325851	=	8 AF/YR
	e. New MF Exterior = 35 housing units x 26 GPHUD x 365/325851	=	1 AF/YR
	f. Residential Allotment	**=**	**1,560 AF/YR**
	g. Non-Residential = 12,223 people x 32 GPCD x 365 / 325851	=	438 AF/YR
	h. Non-residential Allotment	**=**	**438 AF/YR**
	i. Turf-related Facility = the MAWA for one 18-hole golf course	**=**	**428 AF/YR**
	j. Lost/Unaccounted Water Component @ 10% of total annual use	=	270(4)AF
	k. Lost/unaccounted For Allotment	**=**	**270 AF**
	l. TOTAL ALLOTMENT = Res. + Non-Res. + Turf + LUW	**=**	**2,696 AF**

APPENDIX 5C.2 *(continued)*
TOTAL GPCD CONSERVATION PROGRAM
CONSERVATION REQUIREMENT CALCULATION EXAMPLE
SANTA CRUZ ACTIVE MANAGEMENT AREA

5) ANNUAL TOTAL GALLONS PER CAPITA PER DAY REQUIREMENT

Total GPCD Requirement = 2,696 AF x 325,851 / 12,223 / 365 = **197 GPCD**

(1) The existing GPCD components are listed in Table 5-5 for each large provider. The number given here is for example purposes only.

(2) The New Single Family and Multifamily Interior and Single Family and Multifamily Exterior GPHUD components are based on the requirements for the Santa Cruz AMA. See Appendices 5E and 5F.

(3) Non-Residential GPCD Components are listed in Table 5-5. For providers assigned a non-residential component less than 21 GPCD, the non-residential component may increase up to 21 GPCD during any calendar year.

(4) The Lost and Unaccounted for Water component may vary in any calendar year. The component will equal the amount of lost and unaccounted for water for the calendar year, not to exceed 10%.

APPENDIX 5D
BASE PERIOD (1992-1995) WATER USE DATA FOR LARGE MUNICIPAL PROVIDER
SANTA CRUZ ACTIVE MANAGEMENT AREA

Provider	Single Family Residential Use (GPCD)	Multifamily Residential Use (GPCD)	Non-Residential Use (GPCD)	Turf-Related (AF/YR)	Lost Water (%)
Citizens' Water Resources	N/A	N/A	34[1]	N/A	13
City of Nogales	116	61	46	866.4	11
Rio Rico Utilities	N/A	N/A	39	N/A	11
Valle Verde Water Co.	77	71	11[1]	N/A	10

[1] 1985 non-residential GPCD (1992-1995 average is higher than the 1985 and disproportionate increases in the non-residential GPCD rate are not adjusted for under the Total GPCD Program.

APPENDIX 5E
INTERIOR WATER USE MODEL FOR NEW RESIDENTIAL DEVELOPMENT
SINGLE FAMILY HOUSING UNITS
SANTA CRUZ ACTIVE MANAGEMENT AREA

1. 1.7 g/flush Toilet[1]

A. 4.5 flush per day national average[2]
B. Adjusted to 5 flushes per day to reflect higher retiree population in AZ.
C. Average flush for ULF toilets 1.7 gallons[2]
D. *Calculation:*

1.7 gallons/flush * 5 flushes per person per day = **8.5 GPCD**

2. 2.5 gpm Showerhead[1]

A. 7.9 minutes per shower national average[2]
B. 0.9 shower per person per day[3]
C. 2.5 gallons per minute
D. *Calculation:*

7.9 minutes per shower * 2.5 gallons per minute * 0.9 shower per day = **17.8 GPCD**

3. Low Water Use Dishwasher

A. 9.81 gallons per cycle[4]
B. 0.18 cycle per person per day[2]
C. *Calculation:*

9.81 gallons per cycle * 0.18 cycle per person per day = **1.8 GPCD**

4. Low Water Use Clotheswasher

A. 30.25 gallons per cycle[4]
B. 0.30 cycle per person per day[2]
C. *Calculation:*

30.25 gallons per cycle * 0.30 cycle per person per day = **9.1 GPCD**

5. Bathtub

A. 32.5 gallons average bathtub volume at maximum fill.
B. Use/person/day set at 0.1 to allow 1 bathing event/person/day: 0.9 shower/person/day + 0.1 bath/person/day = 1.0 bathing event/person/day.
C. *Calculation:*

32.5 gallons per bath *0.1 bath per person per day = **3.3 GPCD**

6. 2.5 gpm Faucets

A. 10 GPCD national average faucet use[5]
B. 2.5 gallons per minute
C. *Calculation:*

4.0 minutes per person per day * 2.5 gallons per minute = **10.0 GPCD**

1 A.R.S. § 45-312.

2 Mayer, P., DeOreo, W., Nelson, J., Opiz, E. & allen, B., "North American Residential End Use Study Progress Report," Proceedings of 1997 American Water Works Association Annual Conference, AWWA, 1997.

3 City of Mesa and Logan, Simpson & Dye, "Final Paper: Multi-Family Exterior/Interior Water Use Efficiency Evaluation," October, 1996.

4 Data from ADWR Phoenix AMA, Phoenix Area survey March 1997 average water consumption by 3 models most often installed in hew housing.

5 Data from John O. Nelson Water Resources management for AWWA WaterWiser™ (www.waterwiser.org), after Mayer, et. al., AWWA, 1997.

APPENDIX 5E *(continued)*
INTERIOR WATER USE MODEL FOR NEW RESIDENTIAL DEVELOPMENT
SINGLE FAMILY HOUSING UNITS
SANTA CRUZ ACTIVE MANAGEMENT AREA

7. Miscellaneous[5]

A. Average leak and unidentified flow trace volume = **6.6 GPCD**

New Residential Interior Water Use Model Summary

Toilet	8.5 GPCD
Shower	17.8 GPCD
Dishwasher	1.8 GPCD
Clotheswasher	9.1 GPCD
Bathtub	3.3 GPCD
Faucets	10.0 GPCD
Miscellaneous	6.6 GPCD
	57.1 GPCD

[5] Data from John O. Nelson Water Resources management for AWWA WaterWiser™ (www.waterwiser.org), after Mayer, et. al., AWWA, 1997.

APPENDIX 5F.1
EXTERIOR WATER USE MODEL FOR NEW RESIDENTIAL DEVELOPMENT
SINGLE FAMILY HOUSING UNITS
SANTA CRUZ ACTIVE MANAGEMENT AREA

SWIMMING POOLS

Average Water Consumption

1. Evaporation[1]
   A. Average Evapotranspiration (ETo) = 64.29 inches/yr
   B. Average Rainfall = 18.63 inches/yr
   C. *Calculation:*
      64.29 in/yr ETo - 18.63 in/yr rainfall = 45.66 in/yr
      45.66 inches per year / 12 feet per inch = 3.81 ft/yr
      400 square feet * 3.81 ft/yr * 7.48 gal/cubic foot = **11,385 gallons/year**

2. Backwash[2]
   A. Recommended backwash 2 to 4 minutes 23 times a year at 75 to 85 gallons per minute
   B. *Calculation:*
      2 minutes * 75 gpm * 23 times/year = **3,450 gallons/year**

3. Maintenance Refill[2]
   A. Average pool size is 400 square feet of surface by 5 feet deep
   B. Allow for a refill once every ten years - ADWR assumption
   C. *Calculation:*
      400 * 5 = 2,000 * 7.48 = 14,960 gallons per new pool
      14,960 gallons / 10 years = **1,496 gallons/year**

4. Initial Fill
   A. Average pool size is 400 square feet of surface by 5 feet deep
   B. *Calculation:*
      400 * 5 = 2,000 * 7.48 = **14,960 gallons**

5. Total Annual Demand
   A. Total Demand for Pool:

Evaporation	11,385 gallons/year
Backwash	3,450 gallons/year
Initial Fill	14,960 gallons/year
Maintenance Refill	1,496 gallons/year
	31,291 gallons/year

   B. Savings From Pool cover:[1]
      1) Average Oct. - Apr. Reference Evapotranspiration (ETo) = 27.42 inches/yr
      2) Average Oct. - Apr. Rainfall = 7.17 inches/yr
      3) *Calculation:*
         27.42 in/yr ETo - 7.17 in/yr rainfall = 20.25 in/yr
         20.25 inches per year / 12 feet per inch = 1.69 ft/yr
         400 square feet * 1.69 ft/yr * 7.48 gal/cubic foot = **5,056 gallons per year**

[1] ETo and rainfall from Arizona Meteorological Network, Nogales Station, 1964-1983, (www.ag.arizona.edu/AZMET)
[2] Data from National Spa and Pool Institute, ADWR Phoenix AMA telephone interview, December, 1995.

APPENDIX 5F.1 *(continued)*
EXTERIOR WATER USE MODEL FOR NEW RESIDENTIAL DEVELOPMENT
SINGLE FAMILY HOUSING UNITS
SANTA CRUZ ACTIVE MANAGEMENT AREA

Installation Rates[3]

A. 10% of new housing will install a pool.
B. 1% of new housing install a pool per year.
C. 59.22% of pool owners use a pool cover from October through April.
D. *Calculation:*

Evaporation - 11,385 gallons/year * 10%	=	1,139 gallons/year
Backwash - 3,450 gallons/year * 10%	=	345 gallons/year
Initial Fill - 14,960 gallons/year / 10 years * 10%	=	150 gallons/year
Maintenance Refill - 1,496 gallons/year * 10%	=	150 gallons/year
		1,784 gallons/year
Cover 5,056 gallons/year * 59.22% * 10%	=	- 299 gallons/year
		1,485 gallons/year

Demand per Housing Unit per Day

1,485 gallons/year / 365 days/year = **4.07 GPHUD**

[3] Abernathy, Steven, data from exterior water use survey of single family residential housing built 1990-1998, for ADWR, 1998.

APPENDIX 5F.2
EXTERIOR WATER USE MODEL FOR NEW RESIDENTIAL DEVELOPMENT
SINGLE FAMILY HOUSING UNITS
SANTA CRUZ ACTIVE MANAGEMENT AREA

EVAPORATIVE COOLERS

Average Water Consumption[5]

1. Average water consumption per cooling season for evaporative coolers with a bleed-off system is 23,248 gallons (2,906 cooling hours per season @ 8 gallons per hour).
2. Average water consumption per cooling season for evaporative coolers without a bleed-off system is 11,624 gallons (2,906 cooling hours per season @ 4 gallons per hour).
3. 40.98% of coolers utilize a bleed-off system.
4. 59.02% of coolers do not utilize a bleed-off system.
5. *Calculation:*

23,248 * 59.02	=	13,721 gallons
11,624 * 40.98%	=	4,764 gallons
		18,485 gallons

Installation Rates[3]

1. 3.99% of respondents to survey of housing units built 1992-1995 in Tucson Water and Metro Water District service areas have only evaporative cooling.
2. 10.70% have both evaporative and refrigeration cooling.
3. Dual system households average cooling hours per season 59.52% of cooler only households cooling hours
4. *Calculation:*

18,485 gallons/year * 3.89%	=	719 gallons/year
18,485 gallons/year * 10.42% * 59.52%	=	1,146 gallons/year
		1,865 gallons/year

Demand per Housing Unit per Day

1,865 gallons/year / 365 days/year = **5.11 GPHUD**

[5] Data from Karpiscak, M., Babcock, T., France, G., Zauderer, J., Hopf, S. And Foster, K., "Evaporaive Cooler Water Use In Phoenix", Journal, Vol. 90, Issue 4 (April, 1998), American Water Works Association.

APPENDIX 5F.3
EXTERIOR WATER USE MODEL FOR NEW RESIDENTIAL DEVELOPMENT
SINGLE FAMILY HOUSING UNITS
SANTA CRUZ ACTIVE MANAGEMENT AREA

LANDSCAPING

Average Water Consumption

1. Turf
   A. Turf area observed for housing units built 1992-1995 is approximately 600 square feet[3]
   B. Water application at 60% of average annual reference evapotranspiration (64.29 inches)[1]
   C. Effective rainfall at 50% of annual average (18.63 inches)[1]
   D. Irrigation efficiency for residential sprinkler systems at 75%
   E. *Calculation:*

      64.29 inches * 60% = 38.57 inches
      18.63 inches * 50% = 9.32 inches
      38.57 inches - 9.32 inches = 29.26/ 12 = 2.4 feet * 600 sq.ft. = 1,463 cu.ft.
      1,463 cu.ft * 7.48 = 10,943 gallons / 75% = **14,590 gallons**

2. Garden
   A. Garden area observed for housing units built 1992-1995 is approximately 200 square feet [3]
   B. Water application at 70% of average annual reference evapotranspiration (64.29 inches)[1]
   C. Effective rainfall at 10% of annual average (18.63 inches)[1]
   D. Irrigation efficiency for basin or soaker hose watering at 70%
   E. *Calculation:*

      64.29 inches * 70% = 45.0 inches
      18.63 inches * 10% = 1.86 inches
      45.0 inches - 1.86 inches = 432.141 / 12 = 3.60 feet * 200 sq.ft. = 719 cu.ft.
      719 cu.ft * 7.48 = 5,378 gallons / 70% = **7,683 gallons**

3. Trees
   A. Number of trees observed for housing units built 1992-1995 is approximately 8 low water use species and 2 high water use trees.[3]
   B. Water application (% of average reference evapotranspiration)[1,6]
      1) Low water use species = 19.5%
      2) High water use species = 58.0%
   C. Reference Evapotranspiration[1,6]
      1) LWU deciduous species, April - September average, 43.59 inches
      2) HWU deciduous species, April - October average, 48.35
   D. 14 foot average canopy diameter at maturity = water demand at 96 gallons/inch of ETtree [6]
   E. Effective rainfall at 10% of annual average (18.63 inches), Apr.-Sep. average (11.85 inches)[1]
   F. Irrigation efficiency = 70%[7]
   G. *Calculation:*

      48.35 inches * 58.0% = 28.04 inches
      43.59 inches * 19.5% = 8.50 inches
      18.63 inches * 10% = 1.86 inches, 11.85 inches * 10% = 1.19 inches
      28.04 - 1.19 = 26.85 * 96 = 2,577.6 gallons * 2 = 5,155 gallons
      8.50 - 1.19 = 7.31 * 96 = 701.76 gallons * 8 = 5,614 gallons
      5,155 + 5,614 gallons / 70% = **15,384.4 gallons**

APPENDIX 5F.3 *(continued)*
EXTERIOR WATER USE MODEL FOR NEW RESIDENTIAL DEVELOPMENT
SINGLE FAMILY HOUSING UNITS
SANTA CRUZ ACTIVE MANAGEMENT AREA

LANDSCAPING

4. Shrubs, accents, groundcover, vines
   A. Number of plants observed for housing units built 1992-1995 is 11 low water use species and 11 medium water use species.[3]
   B. Water application (% of average annual reference evapotranspiration, 64.29 inches)[1,6]
      1) Low water use species = 19.5%
      2) Medium water use species = 35.5%
   C. 4 foot average canopy diameter at maturity = water demand at 8 gallons/inch of ETplant[6]
   D. Effective rainfall at 10% of annual average (18.63 inches)
   E. Irrigation efficiency =70%[7]
   F. *Calculation:*

64.29 inches * 19.5% = 12.54 inches
64.29 inches * 35.5% = 22.82 inches
18.63 inches * 10% = 1.86 inches
12.54 - 1.86 = 10.68 * 8 = 85.44 gallons * 11 shrubs = 939.84 gallons
22.82 - 1.86 = 20.96 * 8 = 167.68 gallons * 11 shrubs = 1,844.48 gallons
939.82 + 1,844.48 gallons / 70% = **3,977.57 gallons**

Installation Rates[3]

A preliminary landscape survey of recently constructed homes in Nogales and Rio Rico found most new homes had some turf, usually in the back yard, and most included a rather large vegetable garden, some trees and several shrubs. A general assumption that 80% of new homes will have turf, 65% will have a substantial garden, and all will have trees and shrubs has been made. These assumptions result in a model that provides adequate water to maintain an attractive landscape, given evapotranspiration and precipitation conditions common to the Santa Cruz basin.

Calculation:

14,590 gallons/year * 80%	=	11,672 gallons/year
7,683 gallons/year * 65%	=	4,994 gallons/year
15,384 gallons/year * 100%	=	15,384gallons/year
3,978 gallons/year * 100%	=	3,978 gallons/year
		36,028 gallons/year

Demand per Housing Unit per Day
36,028 gallons/year / 365 days/year = **98.7 GPHUD**

6 Pima County Cooperative Extension Service, Low4 Program, Landscape Water Conservation Workshop materials: "How to Develop a Drip Irigation Schedule" and "Plant Water Requirements Tucson, Arizona", unpublished.

7 "Landscape Water Management Principles", Irrigation Training and Research Center, California Polytechnic State University, San Luis Obispo, undated.

APPENDIX 5G
TOTAL GPCD CONSERVATION PROGRAM
TURF-RELATED FACILITIES SERVED GROUNDWATER BY MUNICIPAL PROVIDERS AS OF JANUARY 1, 1990 AND MAXIMUM ANNUAL WATER ALLOTMENTS SANTA CRUZ ACTIVE MANAGEMENT AREA

Water Provider - Turf-Related Facility	Allotment (acre-feet)
City of Nogales	
Kino Springs Golf Course	488.6
Palo Duro Golf Course	371.4
TOTAL FOR CITY OF NOGALES	**860.0**

APPENDIX 5H.1

RESIDENTIAL INTERIOR AND EXTERIOR STANDARD REASONABLE CONSERVATION MEASURES

ORDINANCE OR CONDITION OF NEW SERVICE PROHIBITING INSTALLATION OR REPLACEMENT OF PLUMBING FIXTURES IN RESIDENTIAL HOUSING UNITS UNLESS FIXTURES MEET WATER SAVING STANDARDS

Description: *The provider adopts an ordinance or establishes conditions of new service prohibiting the installation of plumbing fixtures in new residential housing units and the replacement of plumbing fixtures in existing residential housing units unless the fixtures meet water efficiency standards. Plumbing fixtures to be covered and their respective maximum use rates are as follows:*

- *Faucets-kitchen and lavatory* *3.0 gpm*
- *Replacement aerators - kitchen and lavatory* *3.0 gpm*
- *Metering faucets* *.25 gpc*
- *Toilets* *1.6 gpf*
- *Showerheads* *3.0 gpm*
- *Evaporative cooling systems/Decorative fountains must be equipped with water recycling or reuse systems*

Waivers may be available for unusual circumstances (e.g., historic buildings or areas where sanitation or health codes may conflict).

Implementation: *The provider shall adopt and enforce a plumbing ordinance or establish conditions of new service prohibiting the installation of plumbing fixtures in new housing units and the replacement of plumbing fixtures in existing housing units unless the fixtures meet the water savings performance standards outlined in the description above. Implementation of this RCM shall include a proactive inspection and enforcement program which ensures compliance with the applicable ordinance or conditions of service.*

Monitoring/Reporting: *The annual report required by A.R.S. § 45-632 shall include a copy of the current local plumbing ordinance or sample conditions of new service agreement which meet the implementation requirements for this RCM. This shall be submitted one time only (the first year of compliance with the Non-Per Capita Conservation Program) unless there is an amendment to the ordinance or agreement.*

In addition, the provider shall include in the annual report evidence of implementation of the applicable ordinance or conditions of service by reporting the number of certificates of occupancy issued in the service area, the number of permits issued for the replacement of plumbing fixtures in existing housing units, the number of housing units inspected, the number and type of plumbing fixture violations and any enforcement action taken.

A provider that is not a city or town shall also collect and examine all inspection records for new permits issued by governmental entities for the installation of original plumbing fixtures in new housing units and the replacement of plumbing fixtures in existing housing units within the provider's service area and report any plumbing code or plumbing ordinance violations that have not been enforced to the governing body of the entity charged with enforcing the code or ordinance.

Note: This documentation will be used to evaluate the effectiveness of the RCM. It will not be used to require any modification of the negotiated Non-Per Capita Conservation Program agreement.

WATER AUDIT AND FIXTURE RETROFIT PROGRAM FOR EXISTING RESIDENTIAL CUSTOMERS

Description: *Water provider staff or hired consultants visit residences, or resident performs self-audit, to examine water use practices, detect leaks, make recommendations for improved efficiency and install retrofit devices. Water use reduction from installation of devices depends on the life of the device, for example toilet flapper normally last about five years.*

Implementation Levels: *Minimum Conservation Potential: The provider shall notify all existing residential customers of the availability of a self-audit and retrofit kit. The provider shall distribute a kit to all customers who request one. Moderate Conservation Potential: The provider shall perform minimum level requirement, plus a minimum of 10 percent of all pre-1980 housing units shall be audited and retrofitted, free of charge to the customer, by January 1, 2010 either by the homeowner or by a trained auditor. Maximum Conservation Potential: The provider shall perform minimum level requirement, plus a minimum of 20 percent of all pre-1980 housing units shall be audited and retrofitted, free of charge to the customer, by January 1, 2010 either by the homeowner or by a trained auditor.*

The self-audit and retrofit kit shall include, at a minimum, toilet leak detection dye tabs, instructions on measuring flow from fixtures, leak repair and fixture replacement instructions, advice on behavioral changes to save water, a toilet conservation device, a low flow showerhead and faucet aerators. The audit shall include measurement of flow rates from plumbing fixtures and a check for leaks.

The housing units audited or retrofitted to meet this requirement shall not include any housing unit that was audited or retrofitted prior to acceptance into this program for the third management period unless the water use of the housing unit is inefficient.

Monitoring and Reporting Requirements: *The Annual Report required by A.R.S. § 45-632 shall include a report containing information as agreed to at the time of acceptance into the Non-Per Capita Conservation Program sufficient to assess program effectiveness, including information on the method(s) used to contact customers, the annual number of audits and retrofits performed and self-audit kits sent out, and an estimate of the number and volume of leaks found and repaired.*

AUDIT PROGRAM FOR EXISTING RESIDENTIAL CUSTOMERS

Description: *Trained auditors visit residences to examine outdoor water use practices, or materials are supplied for a self-audit of outdoor water use practices. Areas of emphasis are irrigation scheduling advice, sprinkler and drip systems inspection, evaporative cooler inspection, information on improving water retaining capacity of the soil, information on Xeriscape™ concepts and swimming pool maintenance and evaporation control (i.e., pool covers). This program shall be designed to target those customers with the greatest conservation potential.*

Implementation Levels: *Minimum Conservation Potential: The provider shall notify all existing residential customers of the availability of an exterior water use self-audit packet. The packet shall include at a minimum information on checking irrigation systems for efficiency and leaks, information on checking evaporative coolers for efficiency and leaks, irrigation schedules, and information on Xeriscape™. The provider shall distribute a packet to all customers who request one. Moderate Conservation Potential: The provider shall implement the minimum level program plus 5 percent of total housing units in existence when the provider is accepted into this program shall be audited either by the homeowner or a trained auditor free of charge to the customer. Audits shall be completed by January 1, 2010. Maximum Conservation Potential: The provider shall implement the minimum level program plus 10 percent of total housing units in existence when the provider is accepted into this program shall be audited either by the homeowner or a trained auditor free of charge to the customer. The audits shall be completed by January 1, 2010.*

For both the moderate and maximum levels of implementation, the ratio of audited multifamily housing units to audited single family housing units shall be no greater than the ratio of total multifamily housing units to total single family housing units in the entire service area.

The housing units audited to meet this requirement shall not include any housing unit that was audited prior to acceptance into this program for the third management period unless the water use of the housing unit is inefficient.

Monitoring and Reporting Requirements: *The Annual Report required by A.R.S. § 45-632 shall include a report on the number of housing units audited, plus a follow-up survey of a statistically significant sample of those audited, as agreed to by the director, to determine if audited customers have implemented any changes in exterior use habits, irrigation system, or landscaping.*

LANDSCAPE WATERING ADVICE PROGRAM FOR EXISTING AND NEW RESIDENTIAL CUSTOMERS

Description: *Landscape watering advice helps existing and new homeowners to irrigate efficiently. The components of a landscape watering advice program may include guidelines for irrigation scheduling based on time of day or season and dissemination of weather-based watering information (e.g: ET rate based on solar radiation, temperature, rainfall and relative humidity). Programs which encourage watering only every other day and only at certain times of day have also been shown to save water.*

Implementation Levels: *Minimum Conservation Potential: The provider shall notify all existing and new residential customers of the availability of information from the provider regarding the general benefits of efficient landscape watering including water and cost savings. This notification shall be through water bill inserts printed directly on bills in a prominent manner, or some other mechanism approved by the director. The provider shall distribute the landscape watering information to all customers who request it. Moderate Conservation Potential: The provider shall mail the landscape watering information to all existing and new residential customers or make it available to the customers at local distribution centers such as schools, libraries, plant nurseries, or model homes and notify all residential customers of the location of the information. Maximum Conservation Potential: The provider shall implement the moderate level programs plus hold workshops on landscape irrigation and/or have a landscape advisor available for telephone advice to customers and/or develop a conservation goal-billing program designed to assist residential customers to determine the requirements for landscape water use. The provider shall hold at least one workshop annually for every 100,000 persons in the provider's service area. If there are less than 100,000 persons, the provider shall hold one workshop annually. If the telephone advice option is chosen, the provider shall publicize the telephone number at least once quarterly.*

Monitoring and Reporting Requirements: *The Annual Report required by A.R.S. § 45-632 shall include a report on the methods used to contact customers, the number of pamphlets/brochures distributed, the number of workshops conducted, and the number of phone calls taken to give landscape irrigation advice.*

ORDINANCE OR CONDITION OF NEW SERVICE FOR MODEL HOMES IN NEW RESIDENTIAL DEVELOPMENTS

Description: *Model homes in new developments are required to use low water use landscaping in front yards to set the tone for landscaping by homeowners. This measure helps to educate home buyers about the possibilities of appropriate landscaping for the area. Provision of information on low water use landscaping and/or landscape packages offered to new home buyers reinforces the message.*

Implementation: *The provider shall adopt and enforce an ordinance or establish conditions of new service requiring that new model homes meet water efficient standards. These include limitation of water-intensive landscaping to 10 percent of landscapable area, location of such landscaping where it is functionally useful, use of low water use plants from the Department's Low Water Use/Drought Tolerant Plant List (Appendix 5B) in the remaining area, and use of efficient irrigation systems in all areas. Information on low water use landscaping and/or landscape packages with low water use landscaping shall be made available and displayed in a prominent manner at the model home site. For purposes of this RCM, the term "water-intensive landscaped area" means an area of land that is watered with a permanent water application system and planted primarily with plants not listed in Appendix 5B (Low Water Use/Drought Tolerant Plant List), or any modifications to the list, and the total surface area of all water features (including swimming pools of any size, fountains, ponds, water courses, waterfalls, and other artificial water structures) filled or refilled with water from any source.*

Monitoring and Reporting Requirements: *The Annual Report required by A.R.S. § 45-632 shall include a copy of the ordinance or sample conditions of new service agreement used to meet the implementation requirements for this RCM. This shall be submitted one time only (the first year of compliance with the Non-Per Capita Conservation Program) unless there is an amendment to the ordinance or agreement. Each calendar year the provider shall submit a report on the number and location of model homes built during the reporting year.*

In addition to the annual reporting requirements, the provider shall maintain and submit to the Department upon request a copy of the landscape packages or landscape information provided by each developer to new home buyers.

RESIDENTIAL EXTERIOR
STANDARD RCM

PROHIBIT THE CREATION OF COVENANTS, CONDITIONS AND RESTRICTIONS WHICH REQUIRE THE USE OF WATER-INTENSIVE LANDSCAPING OR WHICH PROHIBIT THE USE OF LOW WATER USE LANDSCAPING IN NEW RESIDENTIAL DEVELOPMENTS

Description: *In an effort to promote and facilitate installation of water conserving landscaping, the provider refuses to serve water to new subdivisions which have covenants, conditions and restrictions which require the use of water-intensive landscaping or prohibit low water use landscaping. This would not prohibit water-intensive landscaping, but would allow homeowners to install the landscaping of their choice.*

Implementation: *The provider shall adopt and enforce an ordinance or establish conditions of new service requiring that developers of new subdivisions neither forbid low water use landscaping nor require water-intensive landscaping through covenants, conditions and restrictions.*

Monitoring and Reporting Requirements: *The Annual Report required by A.R.S. § 45-632 shall include a copy of the ordinance or sample conditions of new service agreement used to meet the implementation requirements for this RCM. This shall be submitted one time only (the first year of compliance with the Non-Per Capita Conservation Program) unless there is an amendment to the ordinance or agreement.*

RESIDENTIAL EXTERIOR
STANDARD RCM (CHOICE 1 OF 3)

ORDINANCE OR CONDITION OF NEW SERVICE LIMITING USE OF TURF AND OTHER WATER-INTENSIVE LANDSCAPING IN NEW MULTIFAMILY DEVELOPMENTS

Description: *The provider adopts an ordinance or establishes conditions of new service which limit and set criteria for water-intensive landscaping in multifamily developments.*

Implementation: *The provider shall adopt and enforce an ordinance or establish conditions of new service requiring that new multifamily developments meet water conserving landscaping standards, including limitation of water-intensive landscaping to individual patio areas and those areas used for active recreational purposes, and prohibiting water-intensive landscaping in all other areas, including common areas not used for active recreational purposes. In addition, the ordinance or conditions of new service shall require the use of efficient irrigation systems.* ***This RCM can be chosen only by providers with significant conservation potential in the new multifamily sector.***

Monitoring and Reporting Requirements: *The Annual Report required by A.R.S. § 45-632 shall include a copy of the ordinance or sample conditions of new service agreement used to meet the implementation requirements for this RCM. This shall be submitted one time only (the first year of compliance with the Non-Per Capita Conservation Program) unless there is an amendment to the ordinance or agreement.*

RESIDENTIAL EXTERIOR
STANDARD RCM (CHOICE 2 OF 3)

ORDINANCE OR CONDITION OF NEW SERVICE LIMITING USE OF TURF AND OTHER WATER-INTENSIVE LANDSCAPING IN COMMON AREAS OF NEW SINGLE FAMILY AND MULTIFAMILY DEVELOPMENTS
Description: *The provider adopts an ordinance or establishes conditions of new service which limits turf and other water-intensive landscaping within common areas of new single family and multifamily developments.*
Implementation: *The provider shall adopt and enforce an ordinance or establish conditions of new service requiring that water-intensive landscaping within all common areas of new housing developments not exceed 10 percent of the total landscapable area of the common area. Those areas used for active recreational purposes shall not be included in calculating the common area.*
Monitoring and Reporting Requirements: *The Annual Report required by A.R.S. § 45-632 shall include a copy of the ordinance or sample conditions of new service agreement used to meet the implementation requirements for this RCM. This shall be submitted one time only (the first year of compliance with the Non-Per Capita Conservation Program) unless there is an amendment to the ordinance or agreement.*

RESIDENTIAL EXTERIOR
STANDARD RCM (CHOICE 3 OF 3)

REBATE PROGRAM FOR NEW RESIDENTIAL CUSTOMERS
Description: *A rebate is offered for new landscapes that are designed to be efficient in water use. The landscapes may be required to meet pre-established design, plant selection, installation, and maintenance standards.*
Implementation: *The provider shall offer all new residential customers a rebate for installing low water use landscaping. The rebate shall be in the form of cash, a reduction in water bills, or a waiver or rebate of the development (hookup) fee.*
Monitoring and Reporting Requirements: *The Annual Report required by A.R.S. § 45-632 shall include the number of rebates given, the amount of money distributed to participating customers and an estimate of water savings for the reporting year.*

APPENDIX 5H.2

NON-RESIDENTIAL INTERIOR AND EXTERIOR STANDARD REASONABLE CONSERVATION MEASURES

NON-RESIDENTIAL INTERIOR
STANDARD RCM

INTERIOR AUDIT PROGRAM FOR EXISTING FACILITIES
***Description**: The provider offers audits conducted by trained personnel or instructions for a self-audit to existing non-residential customers (excluding turf-related facilities, large scale cooling facilities, and landscaped public rights-of-way). These audits will be designed to include personal sanitation, cooling, and process water use as applicable for each facility. Audits for personal sanitation include visual leak detection, water budget analysis, recommendations for improved water use efficiency, staff education, and a retrofit analysis; cooling audits include education to determine system conductivity, maintenance practices, system operation, and design characteristics. Process water uses are audited where conservation potential exists. After the audit has been conducted the facility compiles information into a post-audit report to be submitted to the provider. Provider staff reviews and makes recommendations to improve water usage at the facility.*
***Implementation:** The provider shall notify all existing non-residential customers (excluding turf-related facilities, large scale cooling facilities and landscaped public rights-of-way) of the availability of an audit performed on-site free of charge by staff or hired consultants, or a self-audit packet which at a minimum shall include information on how to conduct a self-audit and complete a post-audit report to be returned to the provider. The provider shall evaluate each analysis and make recommendations to the facility for water conservation potential. Existing non-residential customers that collectively receive at least 20 percent of the total non-residential water use in the provider's service area (excluding turf-related facilities, large scale cooling facilities, and landscaped public rights-of-way) shall be audited either by the non-residential customer or by trained personnel. The measurement of 20 percent of non-residential use shall be based on the most current water use records available when the provider enters the program. Annual progress requirements will be negotiated between the Department and the provider with the provider required to complete all the necessary audits by January 1, 2010. **This RCM shall be implemented in conjunction with the Exterior Audit for Existing Facilities**.*
***Monitoring/Reporting:** The Annual Report required by A.R.S. § 45-632 shall include the number of facilities audited by the provider and the number of facilities that conducted a self-audit and returned a post-audit report to the provider within the reporting year. The annual report shall include the name and type of facility audited and its annual water use for the previous year. The provider shall maintain and make available for the Department's inspection the name, address, phone number, contact person, and audit report for each facility audited.* *In addition to the annual reporting requirements, the provider shall collect, maintain and submit to the Department upon request information on selected facilities that utilize this program in order to allow an effective evaluation of the program. The number of records and type of data to be maintained will be determined at the time the provider enters the program. Note: This evaluation will be used to improve effectiveness of RCMs. It will not be used to require any modification of the negotiated Non-Per Capita Conservation Program agreement.*

NON-RESIDENTIAL INTERIOR
STANDARD RCM

ORDINANCE OR CONDITION OF NEW SERVICE PROHIBITING INSTALLATION OR REPLACEMENT OF PLUMBING FIXTURES IN NON-RESIDENTIAL FACILITIES UNLESS FIXTURES MEET WATER SAVING STANDARDS

Description: *Provider adopts an ordinance or establishes conditions of new service prohibiting the installation of plumbing fixtures in new non-residential facilities and the replacement of plumbing fixtures in existing non-residential facilities unless the fixtures meet water efficiency standards. Plumbing fixtures to be covered and their respective maximum use rates are as follows:*

- *Faucets-kitchen and lavatory* — *3.0 gpm*
- *Replacement aerators - kitchen and lavatory* — *3.0 gpm*
- *Metering faucets* — *.25 gpc*
- *Gravity tank-type and flushometer toilets* — *1.6 gpf*
- *Electromechanical hydraulic toilets* — *1.6 gpf*
- *Blowout toilets* — *1.6 gpf*
- *Showerheads* — *3.0 gpm*
- *Urinals* — *1.0 gpm*
  (automatic, timed, and self-flushing urinals are prohibited)
- *Evaporative cooling systems/Decorative fountains must be equipped with water recycling or reuse systems*

Waivers may be available for unusual circumstances (e.g., hospitals and other areas where sanitation or health codes may conflict).

Implementation: *The provider shall adopt and enforce a plumbing ordinance or establish conditions of new service prohibiting the installation of plumbing fixtures in new non-residential facilities and the replacement fixtures in existing non-residential facilities unless the fixtures meet the water savings performance standards outlined in the description above. Implementation of this RCM shall include a proactive inspection and enforcement program which ensures compliance with the applicable ordinance or conditions of service.*

Monitoring/Reporting: *The annual report required by A.R.S. § 45-632 shall include a copy of the current local plumbing ordinance or sample conditions of new service agreement which meet the implementation requirements for this RCM. This shall be submitted one time only (the first year of compliance with the Non-Per Capita Conservation Program) unless there is an amendment to the ordinance or agreement.*

In addition, the provider shall include in the annual report evidence of implementation of the applicable ordinance or conditions of service by reporting the number of certificates of occupancy issued in the service area, the number of permits issued for the replacement of plumbing fixtures in existing non-residential facilities, the number of non-residential facilities inspected, the number and type of plumbing fixture violations and any enforcement action taken.

A provider that is not a city or town shall also collect and examine all inspection records for new permits issued by governmental entities for the installation of original plumbing fixtures in new facilities and the replacement of plumbing fixtures in existing non-residential facilities within the provider's service area and report any plumbing code or plumbing ordinance violations that have not been enforced to the governing body of the entity charged with enforcing the code or ordinance.

Note: This documentation will be used to evaluate the effectiveness of the RCM. It will not be used to require any modification of the negotiated non-per capita conservation program agreement.

NON-RESIDENTIAL INTERIOR
STANDARD RCM

DISTRIBUTION OF CONSERVATION INFORMATION TO ALL NEW NON-RESIDENTIAL CUSTOMERS AND SUBMITTAL OF WATER USE PLAN BY NEW LARGE FACILITIES

Description: *Provider distributes a conservation packet to all new non-residential customers when an application is submitted for a building permit. The conservation packet includes educational material on the best commercially available technologies, current codes affecting water use at each facility, and a standard form approved by the Department to be filled out by the new customer. This form will function as the water use plan to be submitted by all new non-residential customers who may potentially use 10 acre-feet or more of water annually. Turf-related facilities, large scale cooling facilities, and new large produce processing facilities are excluded from the requirement to submit a water use plan as they are required in the Industrial Conservation Program to submit a water conservation plan. Utilization of the plan helps increase the awareness of best available technologies as they become available within each industry.*

The water use plan shall identify all water uses anticipated by the user and the water conservation measures to be utilized. The water use plan shall include at least the following information (where applicable):

- *Water conservation education/training for employees*
- *Use of alternative water sources (i.e., CAP, effluent, remediated groundwater, or other non-groundwater sources)*
- *Operating TDS or conductivity for cooling towers and total cooling capacity*
- *Use of best available technologies in accordance with existing process uses (i.e., recirculating systems for process water, alternative dust control methods, automatic shut-down devices to eliminate continual running of water)*
- *Any plans for the reuse of wastewater or process water at the facility*
- *Type of landscaping and irrigation system*

Implementation: *The provider shall distribute a conservation packet as described above to all new non-residential customers prior to construction when an application is submitted for a building permit (private water companies shall distribute a conservation packet when contacted for new service). As a condition of new service, those non-residential customers who will potentially use 10 acre-feet or more of water annually, excluding turf-related facilities, large scale cooling facilities, and new large produce processing facilities, shall be required to submit a water use plan as outlined in the description above to be reviewed by water provider staff. The Department will supply to the provider the necessary form and guidelines to complete the water use plan at the time the provider enters this program. Where necessary, provider staff shall make recommendations for efficient use of water to the new user.*

Monitoring/Reporting: *The Annual Report required by A.R.S. § 45-632 shall include a copy of the sample conditions of new service agreement used to meet the implementation requirements for this RCM. This shall be submitted one time only (the first year of compliance with the Non-Per Capita Conservation Program) unless there is an amendment to the agreement. The provider shall also include in the annual report the number of conservation packets distributed annually and the number of water use plans received during the reporting year.*

In addition to the annual reporting requirements, the provider shall maintain and submit to the Department upon request the water use plans submitted by non-residential customers.

NON-RESIDENTIAL INTERIOR
STANDARD RCM

EXTERIOR AUDIT PROGRAM FOR EXISTING NON-RESIDENTIAL CUSTOMERS

***Description**: Trained auditors visit existing non-residential customers (excluding turf-related facilities, large scale cooling facilities, and landscaped public rights-of-way) to examine outdoor water use practices, or materials are supplied for a self-audit of outdoor water use practices. These audits are designed for landscape water use and include a survey of water use practices or scheduling, a visual leak detection analysis, examination of the current irrigation system maintenance and efficiency, and an examination of existing employee education or training. After the audit has been conducted the facility compiles information into a post-audit report to be submitted to the provider. Provider staff reviews and makes recommendations to improve water usage at the facility.*

Implementation:** The provider shall notify all existing non-residential customers (excluding turf-related facilities, large scale cooling facilities, and public rights-of-way) of the availability of an audit performed on-site free of charge by staff or hired consultants, or a self-audit packet which shall include at a minimum information on how to conduct a self-audit and complete a post-audit report to be returned to the provider. The provider shall evaluate each post-audit report and make recommendations to the facility for water conservation potential. Existing non-residential customers that collectively receive at least 20 percent of the total non-residential water use in the provider's service area (excluding turf-related facilities, large scale cooling facilities, and landscaped public rights-of-way) shall be audited either by the non-residential customer or by a trained auditor. The measurement of 20 percent of non-residential use shall be based on the most current water use records available when the provider enters the program. Annual progress requirements will be negotiated between the Department and the provider with the provider required to complete all the necessary audits by January 1, 2010.* ***This RCM shall be implemented in conjunction with the Interior Audit for Existing Facilities.

***Monitoring/Reporting:** The Annual Report required by A.R.S. § 45-632 shall include the number of facilities audited by the provider and the number of facilities who conducted a self-audit and returned a post-audit report to the provider within the reporting year. The annual report shall include the name and type of facility audited and its annual water use for the previous year. The provider shall maintain and make available for the Department's inspection the name, address, phone number, contact person, and audit report for each facility audited.*

In addition to the annual reporting requirements, the provider shall collect and maintain information on selected facilities that utilize this program in order to make an effective evaluation of the program. The number of records and type of data to be maintained will be determined at the time the provider enters the program. Note: This evaluation will be used to improve effectiveness of RCMs. It will not be used to require any modification of the negotiated Non-Per Capita Conservation Program agreement.

NON-RESIDENTIAL INTERIOR
STANDARD RCM

LANDSCAPE ORDINANCE OR CONDITION OF NEW SERVICE FOR NEW FACILITIES
Description: *Provider requires new non-residential customers to limit water-intensive landscaping, install efficient irrigation systems, and limit water features/fountains.*
Implementation: *The provider shall adopt and enforce an ordinance or establish conditions of new service requiring new non-residential customers with greater than or equal to 10,000 square feet of landscapable area to comply with the following, as applicable: (1) If the new non-residential customer is not a hotel or motel, the water-intensive landscaped area within the facility shall not exceed an area calculated by adding 10,000 square feet plus 20 percent of the facility's landscapable area in excess of 10,000 square feet. Schools, parks, cemeteries, golf courses, common areas of housing developments, and public recreational facilities with water-intensive landscaping greater than or equal to 10 acres are exempt from this provision, as they are regulated under the individual user requirements; (2) If the new non-residential customer is a hotel or motel, the water-intensive landscaped area within the facility shall not exceed an area calculated by adding 20,000 square feet plus 20 percent of the facility's landscapable area in excess of 20,000 square feet; (3) Only efficient irrigation systems shall be used; and (4) The use of water features and/or fountains shall be limited and shall be equipped with water recycling or reuse systems.*
Monitoring/Reporting: *The Annual Report required by A.R.S. § 45-632 shall include a copy of the ordinance or sample conditions of new service agreement used to meet the implementation requirements for this RCM. This shall be submitted one time only (the first year of compliance with the Non-Per Capita Conservation Program) unless there is an amendment to the ordinance or agreement.*

APPENDIX 5H.3

EDUCATION
STANDARD
REASONABLE CONSERVATION MEASURES

EDUCATION
STANDARD RCM

PUBLIC INFORMATION AND EDUCATION PROGRAM

Description: *Educating customers about the need for water conservation is essential to the success of any conservation program. There are many ways to educate and inform the public, including the distribution of information packets, brochures, pamphlets, bill inserts, newsletters, fact sheets, calendars, "tents" in restaurants, conducting "workshops," and radio and TV public service announcements (PSAs). Another method is the provision of information that allows customers to compare their current water use with the amount of water they used during the preceding billing period and the same billing period in the previous year. Water use tracking information may be effective because it is personalized and is updated and repeated with every billing cycle. Printed materials and PSAs can be effective for many months to the extent that they are heard, seen or read and acted upon.*

Implementation: *A minimum of once a year, the provider shall supply all customers with information on the following, using methods agreed to at the time of acceptance into the Non-Per Capita Conservation Program: 1) the significance and relevance of water conservation, and methods of conserving water, including information about conservation devices and behavioral changes that save water; and 2) how to participate in other conservation programs offered by the provider under the Non-Per Capita Conservation Program (e.g., audits, rebates, workshops). The provider shall also develop and distribute with every billing, conservation billing in either graphical or numerical format (i.e., graphs or numbers) showing current water use, the amount of water used during the preceding billing period and the same billing period in the previous year.*

Monitoring and Reporting Requirements: *The Annual Report required by A.R.S. § 45-632 shall include examples of the materials provided, a report on the methods used to contact customers, and the number of materials distributed in any form.*

APPENDIX 5H.4

SUBSTITUTE
REASONABLE CONSERVATION MEASURES

SUBSTITUTE REASONABLE CONSERVATION MEASURE LIST

The Substitute Reasonable Conservation Measure List for the Santa Cruz AMA is filed in the Department's Santa Cruz AMA office. A copy of the list effective as of the date of the Non-Per Capita Conservation Program follows in this Appendix. Since the list may be amended in the manner described below, a current list is available upon request from the Santa Cruz AMA office.

PROCEDURE FOR MODIFICATION OF SUBSTITUTE RCM LIST

1. *A municipal provider who seeks to add an RCM to the Substitute RCM List for the Santa Cruz AMA may apply at any time to the director for a modification of the list. The application shall be made on a form prescribed and furnished by the director.*

2. *The director shall review each request for a modification of the Substitute RCM List. The director may request additional information from the applicant and may seek information from other sources as may be necessary to determine whether the list should be modified.*

3. *If the director approves the addition of an RCM to the Substitute RCM List, the director shall place the RCM on a supplemental list that shall be considered an addendum to the Substitute RCM List. The supplemental list shall be available upon request from the Santa Cruz AMA office.*

4. *The director may add an RCM to the Substitute RCM List for the Santa Cruz AMA on the director's own initiative if the director determines that implementation of the RCM, either by itself or in combination with one or more other RCMs on the Substitute RCM List, will result in a water use efficiency for the applicable water use category equivalent to the efficiency that would result from implementation of one or more of the required RCMs for that water use category.*

SUBSTITUTE REASONABLE CONSERVATION MEASURES

RCM	*Description*	*Implementation*
	Residential Interior	
Low Flow Plumbing Rebate Program for Existing Residential Customers	*Provider grants a financial rebate to residential homeowners who elect to replace existing high water use toilets, showerheads and faucets with low-flow devices, consistent with the AWEPA.*	*Negotiated and approved by the director.*
Toilet Leak Detection & Repair Program for Existing Residential Customers	*Provider supplies non-toxic dye tablets and instructions to conduct a toilet leak detection analysis and suggestions for leak repairs.*	*Negotiated and approved by the director.*
Landscape Retrofit Program for Existing Residential Customers	*Provider grants financial incentives, including rebates, to existing customers for conversion of existing high water use landscapes to low water use landscapes. Provider supplies examples of landscape plans, plant lists, irrigation methods, and information on soil amendments and preparation.*	*Negotiated and approved by the director.*
	Residential Exterior	
Effluent Reuse - Recycled Wastewater for Existing or New Residential Customers	*Provider develops an effluent reuse system for existing or new housing developments and provides incentives for the reuse of effluent at facilities capable of utilizing the resource.*	*Negotiated and approved by the director.*
Low Water Use Ordinance or Condition of New Service for New Residential Customers	*Provider develops conditions of new service or ordinances that limit turf and other water-intensive landscaping in all new developments consistent with the new single family and multifamily residential exterior water use models in the Third Management Plan for the provider's AMA.*	*Negotiated and approved by the director.*
	Non-Residential Interior	
Retrofit Distribution or Rebate Program	*Provider supplies retrofit kits or provides rebates to non-residential facilities that elect to retrofit existing high water using plumbing fixtures to low water using fixtures consistent with the AWEPA.*	*Negotiated and approved by the director.*
Process Water Conservation Program for New or Existing Facilities	*Provider develops a program that identifies the non-residential customers within the provider's service area with the greatest conservation potential and assigns conservation measures aimed at reducing water use in these facilities.*	*Negotiated and approved by the director.*

SUBSTITUTE REASONABLE CONSERVATION MEASURES

RCM	*Description*	*Implementation*
	Non-Residential Exterior	
Rebate Program for Low Water Use Landscaping & Irrigation System Improvements for Existing or New Facilities	*Provider offers financial incentives (e.g., rebates, reduced rates, wholesale prices on plant materials, or financing packages) to non-residential facilities to replace existing landscaping and irrigation system or installation of new landscaping or irrigation systems with low water use landscaping and efficient irrigation technologies.*	*Negotiated and approved by the director.*
Effluent and Wastewater Use Incentives for Existing and New Facilities	*Provider offers incentives for conversion of existing irrigation systems or installation of new irrigation systems capable of utilizing effluent or wastewater (includes all water discharged after an industrial or commercial use, excluding effluent) for landscape watering.*	*Negotiated and approved by the director.*
Ordinance or Condition of Service Requiring The Use of Effluent for New Public Recreation Facilities	*The provider adopts an ordinance or condition of service requiring the use of effluent in new public recreation facilities, including turf-related facilities and other facilities with a water-intensive landscaped area of 10 or more acres. The ordinance or condition of new service shall require the owner of the facility to demonstrate to the Department that the facility will be designed and operated in a manner that conserves water. Publicly owned rights-of-way are exempt from this requirement. For purposes of this RCM, "turf-related facility" and "water-intensive landscaped area" have the meanings prescribed by section 6-301 of Chapter 6.*	*Negotiated and approved by the director*
	Education	
Training Opportunities	*Provider offers ongoing seminars, workshops, lectures, and videos to promote water conservation to residential or non-residential customers, employees, educators, or professional interest groups. Topics could include landscape design and maintenance, interior water conservation methods, or general background information on regional water supply issues.*	*Negotiated and approved by the director.*
Youth Programs	*Provider assists local school district(s) to provide water conservation and water supply information to students. Assistance can include classroom presentations, teacher education programs, curriculum, and field trips to water-related facilities.*	*Negotiated and approved by the director.*
Demonstration Sites and Exhibits	*Provider establishes, maintains and promotes facilities, sites, and exhibits that demonstrate water conservation including demonstration gardens, demonstration homes, conservation exhibits, and public activities.*	*Negotiated and approved by the director.*

SUBSTITUTE REASONABLE CONSERVATION MEASURES

RCM	*Description*	*Implementation*
Media-Related Outreach	*Provider to develop a media-outreach program focused on water conservation including news articles, features, and series, magazine stories, radio and television public service announcements, and television specials. Additionally, novelty items to promote local or regional conservation efforts can be distributed including buttons, posters, and bumper stickers.*	*Negotiated and approved by the director. Must include a method to evaluate effectiveness and market penetration.*
	System-Related Measures	
Water Audit Program	*Provider has an audit conducted by a trained auditor of the distribution system, accuracy of the water agency records, and systems control equipment. The audit should identify, quantify, and verify water and revenue losses to allow the provider to select and implement programs to reduce water and revenue losses. Such examination should be performed annually to update the results of earlier audits. The audit must include an analysis of the water audit results and possible corrective measures including resulting costs, feasibility, and savings.*	*Negotiated and approved by the director.*
Leak Detection Program	*Provider implements a leak detection program in conjunction with a water audit (see substitute RCM - Water Audit). The leak detection program must address losses due to leaks, unauthorized use (street, sewer, and fire departments), water department maintenance, and meter under-registration and must include repair, maintenance, and meter testing. Flushing frequency and exercise of valves should also be accounted for.*	*Negotiated and approved by the director.*
Conservation-Based Rate Structure	*Provider develops a water rate structure which results in slowing the increase in water consumption that traditionally accompanies increases in population and per capita income. Pricing structures which may result in conservation are: increasing block rate, lifeline rate, seasonal rate, and excess demand surcharge. To be effective, the rate structure must clearly send a conservation message. The rates structure established should ensure that customers receive the proper signal that allows them to make a choice as to whether or not to implement conservation measures. Additionally, the water rate revision should be accompanied by a public awareness campaign, a water conservation device distribution program, pamphlets on low water use landscaping, or other conservation measures to increase the effectiveness of the program.*	*Negotiated and approved by the director.*

SUBSTITUTE REASONABLE CONSERVATION MEASURES

RCM	***Description***	***Implementation***
Conservation Coordinator	*Provider employs a staff person whose sole responsibility is to ensure the implementation of effective water conservation programs. The employee would act to coordinate conservation efforts in conjunction with utility staff and be the primary contact for the public regarding conservation information. The coordinator could initiate an information campaign including: pamphlets, fact sheets, bill stuffers, public service announcements, and press releases. The coordinator can also coordinate direct conservation activities other than education.*	*Negotiated and approved by the director. Includes submittal of a complete job description for the position as well as annual goals and objectives for the program.*
Water Tampering and Water Waste	*Water provider adopts and enforces ordinances or implements policies regarding excessive and wasteful use of water. Meter reading staff and customers report water theft where ordinances are not applicable. Staff performs regular checks of water delivered and water used in distinct parts of the service areas where there is greater susceptibility to water theft.*	*Negotiated and approved by the director.*

APPENDIX 5I
ALTERNATIVE CONSERVATION PROGRAM
RESIDENTIAL CONSERVATION REQUIREMENT COMPONENT CALCULATIONS
SINGLE FAMILY HOUSING UNITS
SANTA CRUZ ACTIVE MANAGEMENT AREA

1. Existing Residential Allotment

   a. Determine the population in single family housing units as of July 1, 2000,
   Determine the population in multifamily housing units as of July 1, 2000,
   Add the Single Family and Multifamily Population to determine Year 2000 Residential Population;

   b. Multiply the year 2000 residential population by the provider's existing residential GPCD component (Appendix 5B), multiply this number by 365 days, and divide the product by 325,851;

   c. The result is an annual volumetric allotment, in acre-feet, for existing residential uses. Reasonable reductions in GPCD are included in the annual target calculation.

2. New Single Family and Multifamily Residential Allotment:

   a. Determine the new single family housing units added since July 1, 2000,
   Determine the new single family population (post-7/1/00) for the calendar year,
   Determine the new multifamily housing units added since July 1, 2000,
   Determine the new multifamily population (post-7/1/00) for the calendar year;

   b. Multiply the new single family housing units and the new multifamily population by the exterior rates for new residential development:

Single Family	=	107 GPHUD
Multifamily	=	26 GPHUD

   Add the products, multiply the result by 365 days, and divide the product by 325,851;

   c. Multiply the sum of the new single family population and the new multifamily population by the interior rate for new residential development of 57 GPCD, multiply the result by 365 days, and divide the product by 325,851;

   d. Add the results from subparagraphs 2.a and 2.b. The sum is an annual volumetric allotment, in acre-feet, for new residential uses.

3. Add the existing residential allotment from subparagraph 1.c and the new residential allotment from subparagraph 2.d. The sum is the TOTAL RESIDENTIAL ALLOTMENT for the calendar year.

APPENDIX 5J
CONSERVATION REQUIREMENTS FOR MUNICIPAL DISTRIBUTION SYSTEMS
LOST AND UNACCOUNTED FOR WATER
SANTA CRUZ ACTIVE MANAGEMENT AREA

Lost & Unaccounted For Includes:

Leaks:
- Distribution Lines
- Sewer Lines
- Storage Tanks
- Storage Ponds
- Hydrants
- Other

Breaks:
- Distribution Lines
- Sewer Lines
- Mains
- Hydrants
- Other

Measurement Errors:
- Meter Under-Registration
- Source Meter Errors
- Flume/Weir Errors

Evaporation

Illegal Connections/Water Theft

Phreatophyte Uses

Water System Uses Include:
- Residential Metered Deliveries
- Non-Residential Metered Deliveries
- Standpipe Uses
- *(1)* Fire Flow
  Hydrant Meter Reading
- *(1)* Hydrant Flow Tests
- *(1)* Fire Sprinkler System Flow Tests
- *(1)* Construction
- *(1)* Dust Control
- *(1)* Line Flushing (distribution, sewer, or treatment facility)
- *(1)* Street Cleaning
- *(1)* Storm Drain Flushing
- *(1)* Water Tests & Pressure Tests
  Well Purging

(1) *These uses may be estimated using a method approved by the director. Documentation must be submitted with annual report.*

APPENDIX 5K
INCIDENTAL RECHARGE FACTOR CALCULATION
SANTA CRUZ ACTIVE MANAGEMENT AREA

Hydrologic Studies
The following information must be provided:

1. A copy of a hydrological study that demonstrates the amount of water supplied by the municipal provider for use within its service area during each of the preceding five years (prior to application to the Non-Per Capita Conservation Program) and the amount of incidental recharge as calculated below that occurred within the municipal provider's service area during each of those years.

2. A copy of a hydrological study that projects the average annual amount of water that the municipal provider will supply for use within its service area during the management period and the average annual amount of incidental recharge as calculated below that will occur within the municipal provider's service area during the management period.

Calculation of the Incidental Recharge and an Incidental Recharge Factor
The following information should be included in the hydrologic studies:

1. A map showing:
   a. Service area boundary.
   b. Location of turfed areas and/or unlined lakes greater than 10 acres where water is provided by the municipal provider applying for the Non-Per Capita Conservation Program.
   c. Location of areas which are served by septic systems.

2. For turfed and water acres:
   a. Combined actual turfed and water acres (of facilities greater than or equal to 10 acres).
   b. Plant consumptive use (actual or using consumptive use rate published in the Second Management Plan), or measured evaporation rates.
   c. Total annual volume of water applied to facility. If only a portion of the water used is supplied by the municipal provider, document the percentage supplied by the provider who is applying for the Non-Per Capita Conservation Program and from other sources.

3. For septic systems:
   a. The number of acres of lots served by septic systems and the number of septic tanks per acre.
   b. Volume of water supplied to that system and documentation of the volume of water incidentally recharged. If only a portion of the water used is supplied by the municipal provider, document the percentage supplied by the provider and from other sources.

4. Total annual volume of water supplied by a provider for use within its service area.

5. Any other data which contributes to incidental recharge within the service area. The Department will review the data and take them under consideration.

APPENDIX 5K *(continued)*
INCIDENTAL RECHARGE FACTOR CALCULATION
SANTA CRUZ ACTIVE MANAGEMENT AREA

Calculations

1. Turf

Annual Incidental Recharge (AF)	=	Total Annual Water Used (AF)	-	[Turfed Acres x Consumptive Use AF/Ac.]

2. Artificial Lakes

Annual Incidental Recharge (AF)	=	Total Annual Water Used (AF)	-	[Lake Acres x Evaporation Rate AF/Ac.]

3. Septic Systems

Annual Incidental (AF)	=	Total Acres of Septic System	x	Number of Septic Systems per Acre	x	Total Annual Water Use per Household(AF)	x	% Water Returned for Recharge

4. **Maximum Estimated Annual Incidental Recharge (AF)** = #1 + #2 + #3 + other data approved by ADWR

5. **Incidental Recharge Factor** = $\frac{\text{Annual Incidental Recharge (\#4)}}{\text{Total Annual Volume of Water Pumped and Received.}}$

APPENDIX 5L
LARGE MUNICIPAL PROVIDER EXISTING RESIDENTAL CONSERVATION POTENTIAL
SANTA CRUZ ACTIVE MANAGEMENT AREA

Municipal Water Provider	Interior Conservation Potential	Exterior Conservation Potential
Citizens' Water Resources - Tubac	Maximum	Maximum
City of Nogales	Moderate	Maximum
Rio Rico Utilities, Inc.	Moderate	Moderate
Valle Verde Water Company	Moderate	Minimum